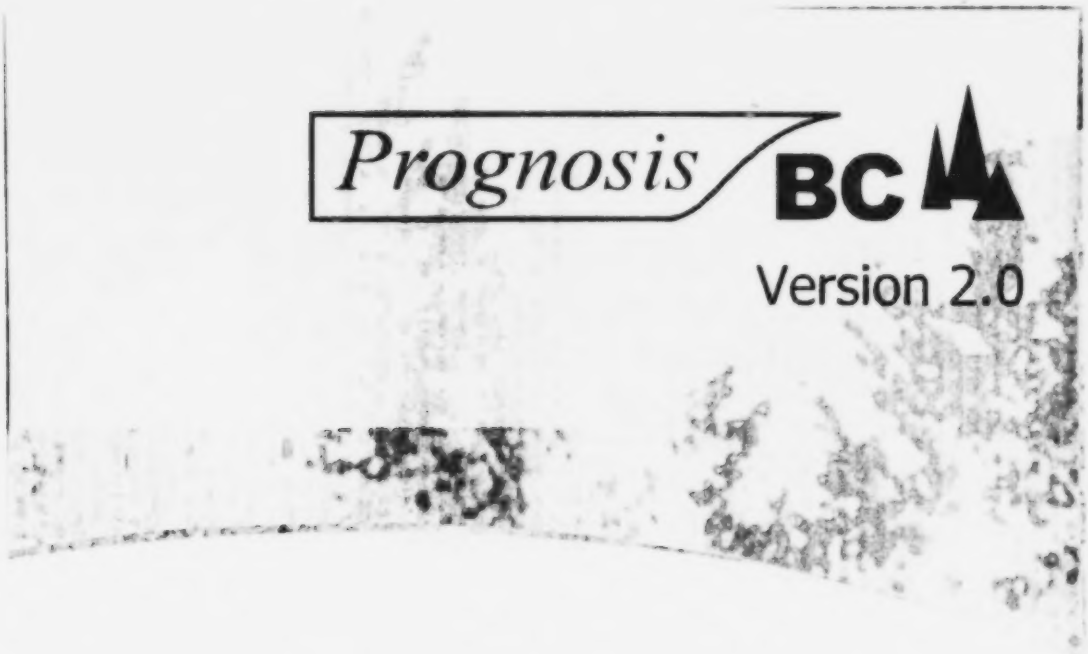

Version 2.0

User's Guide and Tutorials

March 2000

FOREST RENEWAL BC

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Foreword

Prognosis^{BC} is a computer model that forecasts the future condition of mixed species and multi-layered conifer stands. The model is particularly useful for developing silviculture prescriptions in the IDF, ICH, MS and ESSF zones of British Columbia's southern interior. Like TIPSY, Prognosis^{BC} is a decision support tool. Model output should be balanced with professional experience, and knowledge of local conditions and stand dynamics.

Acknowledgements

Funding for this project has been provided by the B.C. Ministry of Forests, Forest Renewal BC, and the Canada–British Columbia Partnership Agreement on Forest Resource Development (FRDA II).

The project team is grateful for support and direction from the U.S. Forest Service staff: Al Stage (retired), Nick Crookston, Bill Wykoff, Melinda Moeur, Bov Eav, and Gary Dixon.

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Government

Forest Practices Branch
Research Branch
Resources Inventory Branch
Timber Supply Branch
Nelson Forest Region
Kamloops Forest Region
Cariboo Forest Region

Industry

Crestbrook Forest Industries
Inland Timber
Interior Lumber Manufacturer's Association
Lignum Limited
Pope and Talbot
Riverside Forest Products Limited
West Fraser
Weyerhaeuser

Consultants

Anthony Robert Consulting
ESSA Technologies Ltd.
Beacon Hill Systems Inc.
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Craig Farnden RPF
Doroshuk English Enterprises
GlobeTree Consulting
FORCOMP Forestry Consulting Ltd.
Interior Reforestation
JMJ Holdings Inc.
J.S. Thrower & Associates Ltd.
Louis Dallaire Consulting
Manzanita Consultants Ltd.
Objective Software
Simons Reid Collins
Sterling Wood Group
Timberline Forest Inventory Consultants
TM Communications Inc.

1.0 Introduction

This document provides information on Prognosis^{BC}, a growth and yield computer model for simple and complex forest stands.

This section introduces you to Prognosis^{BC} – who it is for, what it requires to run, how it is used, how to install it, and how to learn about it.

Section 2.0 outlines the history and development of the model, describes its software components, and discusses how it is being applied in British Columbia.

Section 3.0 covers the model's growth assumptions, and how it works.

Section 4.0 contains "QuickReview," a summary of how to use each of the model's three software components: DATAprog, SIMprog, and VIEWprog. This section is meant as a refresher for users already familiar with Prognosis^{BC}.

Sections 5.0 through 7.0 contain self-guided tutorials on DATAprog, SIMprog, and VIEWprog. These sections are for people new to Prognosis^{BC}.

1.1 Audience

Prognosis^{BC} is intended for foresters working in British Columbia. The model is particularly useful for developing silviculture prescriptions in the IDF, ICH, MS, and ESSF zones of British Columbia's southern interior.

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1.2 Prognosis^{BC} version 2.0 Improvements

The following issues, which were outstanding in the 1998 pilot release of Prognosis^{BC}, have been addressed in version 2.0 (February 2000):

- improved growth estimates for the IDF
- improved height prediction at time of inventory (the model estimates missing heights)
- validated height growth for large trees (unbiased)
- simplified VIEWprog
- addition of Quick Start for SIMprog
- User's Guide and revised tutorials.

1.3 System Requirements

To run Prognosis^{BC} version 2.0, you will need the following hardware:

Hardware	Minimum specifications	Recommended specifications
CPU	486 100Mhz	Pentium 133 MHz
RAM	16 MB	32 MB
Graphics card	VGA	VGA
Hard drive	144 MB	1.6 GB
Monitor	VGA	VGA
Printer/plotter	Microsoft Windows® compatible	Microsoft Windows® compatible

In addition to the Prognosis^{BC} software provided, at minimum you will need Microsoft Windows 95 or NT.

1.4 Installing Prognosis^{BC}

The Prognosis^{BC} version 2.0 software may be installed from either of two installation packages: a set of seven setup diskettes, or a self-extracting zip file (ProgBCversion2install.exe) available from the Prognosis^{BC} Web site: **www.for.gov.bc.ca/research/gymodels/progbc/**.

If you are using the setup diskettes, follow steps 1–3, below.

If you are using the compressed installation file (ProgBCversion2install.exe), double-click it and go to step 3.

1. Insert Disk 1 in your floppy drive, click on the toolbar **Start** button, and select **Run**. A dialog box will appear.

2. Type "**a:\setup.exe**" (replacing "a" with the letter of your floppy drive) in the dialog box, and click OK.

3. Follow the instructions on your screen, choosing the default directory (ProgBC). The installation program will create a directory called ProgBC with seven subdirectories: DATAprog, SIMprog, VIEWprog, Data, Help, Model, and Work.

The installation procedure loads the sample data sets used in these tutorials into the Work sub-directory (C:\ProgBC\Work).

1.5 QuickReview

The QuickReview (Section 4) provides a step-by-step outline of DATAprog, SIMprog, and VIEWprog for users familiar with Prognosis[BC].

Novice users should skip the QuickReview and follow the three tutorials provided in this Guide.

1.6 Self-guided Tutorials

Sections 5.0 to 7.0 contain self-guided tutorials for Prognosis^{BC} software components: DATAprog, SIMprog, and VIEWprog. The sample data files used with the tutorials are contained in the installation package. You can read through the tutorials, or work through them interactively while running the programs (we recommend the latter).

You may wish to start by doing some runs with SIMprog to get an idea of how the model works. After you are familiar with the model, and wish to do some projections using your own data, go to the DATAprog tutorial.

To successfully use Prognosis^{BC} you should be familiar with basic growth and yield concepts, and with Microsoft Windows.

DATAprog, one of the Prognosis^{BC} software components, is a spreadsheet-style application with the same editing features as most commercial spreadsheet packages (e.g., Microsoft Excel). You should be familiar with a commercial spreadsheet package before beginning the DATAprog tutorial.

Conventions Used in Tutorials

This graphic indicates an item of interest—a hint or tip to make the Prognosis^{BC} system easier to use.

This graphic indicates caution or the need to follow instructions explicitly.

1.7 Prognosis^{BC} Training and Support

User Training

One- and two-day training courses for Prognosis^{BC} are available on request from the B.C. Ministry of Forests. Courses include significant hands-on time with Prognosis^{BC}. For information about the training courses contact Barry Snowdon, Forest Practices Branch:

tel: (250) 356-0183
e-mail: barry.snowdon@gems7.gov.bc.ca

User Support

Growth & Yield Model Support Centre

The Growth & Yield Model Support Centre operates a "help desk" for Prognosis^{BC} users. Please register with the Centre to obtain current information and upgrades.

tel: (604) 739-9806
e-mail: gymodels@istar.ca

Prognosis^{BC} Help Facility

Prognosis^{BC} contains detailed online help. To access the help facility, press the F1 key, click Help (DATAprog), or select **Help** from the menu bar (SIMprog, VIEWprog).

Prognosis^{BC} Web site

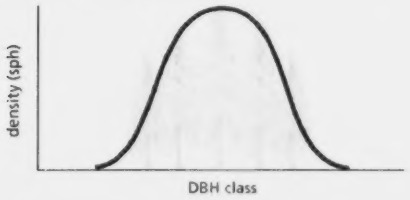
The Prognosis^{BC} Web site provides current information on the model, its development, applications, and training opportunities:

www.for.gov.bc.ca/research/gymodels/progbc/

2.0 What is Prognosis[BC]?

Prognosis[BC] is a computer model that forecasts future stand conditions based on the expected growth and mortality of individual trees in a stand. The stand can be composed of one or several conifer species of similar age or many ages. The model simulates the development of a stand from its current condition, including bareground.

single-species, even-aged



multi-species, multi-aged

The model can predict the development of both even- and uneven-aged, mixed-species stands comprised of the following species:

Douglas-fir	Lodgepole pine	Western hemlock
Engelmann spruce	Mountain hemlock	Western redcedar
Grand fir	Ponderosa (yellow) pine	White pine
Larch	Subalpine fir	

Prognosis[BC] does not include hardwoods. Mountain hemlock is used as a surrogate for aspen, birch, and cottonwood.

One of the model's strengths is its ability to simulate almost any form of harvesting—from clearcutting to partial cutting. Prognosis[BC] can simulate thinning from above, below, or by diameter class—with or without species retention preferences. Thinnings can be scheduled as single or repeated events, by either calendar year or stand condition.

2.1 Model Origins

Prognosis[BC] is British Columbia's adaptation of the U.S. Forest Service *Forest Vegetation Simulator* (FVS). The FVS was developed by Dr. Albert R. Stage (*et al.*)[1] in the early 1970s to support uneven-aged, mixed species management in North Idaho. Today, the suite of FVS products is used successfully in twenty regions across the United States, predominantly in the northwest.

Variants

Variants exist to account for differences in the relationships between growth and site descriptors, different plant communities, and differences in forest management. When the base model is calibrated to reflect the ecology and climate of a specific geographical area, the model assumes the characteristics of that area and is referred to as a variant.

Each variant:

- simulates the growth of species that are most important to the region
- has empirically derived, regionally calibrated growth and mortality equations based on data from that region.

More information about the USFS Forest Vegetation Simulator can be found at the USDA Forest Service Web site for Moscow Forestry Sciences Lab at **http://forest.moscowfsl.wsu.edu/4155/4155.html**.

Prognosis[BC]

FVS was chosen to model the development of complex stands in B.C. because:

- its growth equations are a function of size, vigour, and canopy position (i.e., not age)
- site productivity is described by site characteristics rather than tree characteristics (i.e., site index)
- it has a track record of twenty years reliable use.

The B.C. Ministry of Forests has adapted FVS for use in British Columbia by:

- developing a variant for the B.C. southeast interior—the SEI variant, known as Prognosis[BC] (the North Idaho variant, ecologically similar to B.C.'s southeast interior, was used as a starting point for calibrating the SEI variant)
- developing a Windows-based interface for FVS (SIMprog)
- developing utilities for data input (DATAprog) and output (VIEWprog).

[1] Stage, A.R. 1973. Prognosis model for stand development. USDA For. Serv. Res. Pap. INT-137, 32p. Intermountain Forest and Range Experimental Station, Ogden, Utah.

2.2 Prognosis[BC] Software Components

Prognosis[BC] has three software components. DATAprog is used to format and translate input data into a treelist that describes an existing stand. A menu-driven interface called SIMprog is used to specify the simulation parameters. VIEWprog facilitates the display of stand and stock tables, and changes in species composition through time. These components are described below.

DATAprog

DATAprog is a utility for setting up model input and output files. It is a spreadsheet-style application that allows users to edit imported data files for translation into treelists that can be used by SIMprog to project stand growth. The model can use data from permanent or temporary sample plots, silviculture cruises, or stand tables to represent the current stand condition. DATAprog input files must be text files (i.e., non-binary) with one record of data per tree.

While DATAprog can be used to create a new treelist, it was not designed to be a data entry tool. If more than 50 records are to be entered, it would be more efficient to use a commercial spreadsheet program for initial data entry, and DATAprog to translate the entered data into a treelist.

DATAprog's template feature lets you save the format specifications of the input data as a template that can be applied to similar data files. Templates help to automate the translation of similar data files into treelists by making it unnecessary to format each one.

SIMprog

SIMprog controls the stand-projection engine for Prognosis[BC]. The engine consists of sub-models that predict diameter growth, height growth, crown development, mortality, and regeneration for individual trees (for more detail, see Section 3.0 *How Prognosis[BC] Works*).

SIMprog is the menu-driven interface. The **Runs** menu creates a new run, opens an existing run, saves or deletes the current run, and allows compression of the database. The **Conditions** menu is used to define the simulation, including detailed site information (mandatory), and specifying whether the projection will be based on regeneration (bareground simulation) or on an existing stand. The **Duration and Labels** form specifies the time step and length of the simulation.

Optional parameters include merchantable volume limits, the type of treatments to be simulated, and whether the simulation will model the impact of forest health. Treatment options include juvenile spacing, and partial cutting from above, below, or by DBH.

SIMprog produces stand summary results for each simulation run. It can also launch VIEWprog to display results by species and/or DBH class.

VIEWprog

VIEWprog is a system for reporting the structure of stands projected with SIMprog. Its graphic flexibility allows users to compare the responses of different stand structures to various treatments over time. Two types of reports are available for comparing runs:

- *Stand & Stock Tables* – displays stand structure by species and diameter class for each reporting period (specified time step) in the projection. For each combination of species and diameter class, stand composition is quantified in terms of either density (stems per hectare) or merchantable volume per hectare.
- *Species Composition* – displays changes in stand attributes (stems per hectare, basal area, merchantable volume, total volume) over time, by species.

Both types of report can be displayed for one run, or one type of report can be displayed for two different runs. With either report type, both charts and tables can be produced. The default format is graphical (i.e., charts). Charts can be printed in both black and white, and colour, or can be cut and pasted into other applications (e.g., Microsoft Word). Only tabular reports can be saved as files.

2.3 Extensions to Prognosis[BC]

Western Root Disease

SIMprog Lesson 6 describes how to use the Western Root Disease extension.

An extension to Prognosis[BC] for root disease enables the model to simulate the impact of *Annosus*, *Phellinus*, or *Armillaria* on stand development. It also enables Prognosis[BC] to forecast the effect of management options such as stumping on development of the disease.

Initial root disease conditions may be based on tree inventory damage codes; residual inoculum found in stumps; approximate densities of infected and uninfected trees inside root disease patches; and information on the number, size, and location of disease patches in a stand.

The growth and shrinkage of disease patches is modeled using a separate simulation of the movement of the infection "front" into other areas of disease-free trees. The details of pathogen behaviour can be modeled to local conditions.

To represent the persistence of inoculum following a clearcut harvest, a separate simulation at a finer time scale is used to model the transfer of inoculum to young trees in the regeneration phase.

The extension model simulates the effects of windthrow events and of four types of bark beetles: those that depend on density of susceptible stems, windfalls, or on the density and location of root disease infected stems.

Prognosis EI

The newest product – Prognosis EI – is an environmental indicators model for watershed-level applications (up to 1500 stands). It reports spatial and non-spatial landscape and stand-level indicators for user-defined management regimes.

PrognosisEI combines the forecast stand conditions from Prognosis^{BC} with other ecological data to project future environmental values. Timber and environmental projections are reported as plain text files that can be exported to customized ArcView tools for spatial analysis and automated display of maps and graphs.

The first case-study application of PrognosisEI was a 3300 ha watershed-level study in Nelson B.C.'s West Arm Demonstration Forest. Model behaviour was tested in twelve alternative scenarios – from no management, to large clearcuts, partial cuts, and patch cuts. Case study findings indicated that the model indicators, representing a wide range of stand- and watershed-level timber and non-timber values, were responsive to different management practices and expected levels of root disease.

2.4 Prognosis^{BC} Use Limitations

Prognosis^{BC} is one of eight growth and yield products supported by the B.C. Ministry of Forests. Check the ministry's Web site for more information: **www.for.gov.bc.ca/research/gymodels/progbc/**
Prognosis^{BC} is available free of charge.

Prognosis^{BC} is being considered by the ministry to project ground-based inventories that describe multi-layered and partially cut mixed-species stands. Prognosis^{BC} can be used in stands of Douglas-fir, Engelmann spruce, grand fir, larch, lodgepole pine, mountain hemlock, ponderosa pine, western hemlock, western redcedar, white pine, or subalpine fir. Version 2.0 does not support hardwoods.

Users should consider using VDYP to project even-aged, natural stands, and using TIPSY to conduct **all** bareground projections. Future releases of Prognosis^{BC} will address mixed-species bareground projections.

When using Prognosis^{BC} to simulate partial cutting, it is recommended that the management regime be limited to a maximum of two partial cuts. When simulating the impacts of *Armillaria*, *Phellinus*, and/or *Annosus* on stand development, users should seek advice from the Growth & Yield Model Support Centre.

Prognosis^{BC} version 2.0 reports both solid wood volumes and provisional volume estimates less decay, waste, and breakage.

Prognosis^{BC} is a decision support tool. Model output should be balanced with professional experience and knowledge of local conditions and stand dynamics. Tables 1 and 2 indicate model reliability by subzone, variant, and

site series for Nelson and Kamloops forest regions. The model is undergoing a systematic evaluation (subzone by subzone) over the coming months, and the tables will be progressively revised. Users should check the Prognosis[BC] Web site for updates.

Table 1: Prognosis[BC] reliability matrix for Nelson Forest Region *

	Site Series **						
Subzone/ Variant #	2	3	4	1	5	6	7
ESSFdk	–	–	H	H	–	–	–
ESSFwc4	P	P	–	–	–	–	–
ESSFwm	L	P	P	H	–	–	–
ICHdw	–	–	L	H	–	–	–
ICHmk1	–	H	H	H	P	–	–
ICHmw1	–	–	–	–	L	L	–
ICHmw2	NF	H	H	H	P	L	–
ICHmw3	–	P	M	M	M	–	P
ICHwk1	NF	–	P	L	L	–	–
IDFdm1	NF	–	M	H	L	–	–
IDFdm2	NF	–	M	H	L	–	–
IDFxh1	–	–	P	P	–	–	–
MSdk	NF	M	H	H	L	–	NF
MSdm1	L	L	M	L	–	–	–
PPdh2	NF	–	–	P	–	–	–

* Some data from Kamloops. Site Series 8 (and greater) are beyond the current ecological scope of the model.

** Site Series have been arranged approximately in order of increasing soil moisture.

\# Omitted Subzone/Variants are beyond the current ecological scope of the model.

Legend		
Reliability		**Requirement for increment data**
H	high	recommended
M	medium	recommended
P	poor	highly recommended
L	low	mandatory
–	beyond model scope	n/a
NF	non-forested site	n/a

Table 2: Prognosis^{BC} reliability matrix for Kamloops Forest Region *

	Site Series **						
Subzone/ Variant #	2	3	4	1	5	6	7
ICHmk1	–	P	P	P	P	–	–
ICHmw2	NF	P	P	P	P	L	–
ICHmw3	–	P	P	P	P	–	P
ICHwk1	NF	–	–	L	L	–	–
IDFdk1	–	–	H	H	–	–	NF
IDFdk2	–	M	–	H	–	–	–
IDFxh1	–	–	P	H	–	–	–
IDFxh2	–	–	–	–	P	P	–
MSdm1	L	L	P	L	–	–	–
PPxh2	–	P	–	–	NF	–	–

* Site Series 2 and 7 (and greater) are beyond the current ecological scope of the model.

** Site Series have been arranged approximately in order of increasing soil moisture.

\# Omitted Subzone/Variants are beyond the current ecological scope of the model.

Note: If a "Subzone/Variant" is common to both Forest Regions and has medium (or high) reliability in one region but poor reliability in the other, no data from the second region was used to calibrate the model.

Legend		
Reliability		**Requirement for increment data**
H	high	recommended
M	medium	recommended
P	poor	highly recommended
L	low	mandatory
–	beyond model scope	n/a
NF	non-forested site	n/a

2.5 Prognosis^{BC} Applications

Prognosis^{BC} applications have been undertaken in four forest regions.

Forest Region	Study	Reference
Nelson	Case study with PrognosisEI in the West Arm Demonstration Forest (ICH)	Greenough, J.A., D.C.E. Robinson, W.A. Kurz, S.J. Beukema, N. Densmore, R. Winter, and B. Snowdon. 1999. Use of the Prognosis EI model in balancing timber and environmental values at the watershed level.
	Impact of partial cutting options on yield at the stand and forest level (IDF, ESSF, ICH, MS)	Listar, I. 1998. Potential of partial cutting silvicultural systems to affect stand productivity and wood flow. Technical Report MIT-005. AAC Mitigation Project Nelson Forest Region, BC Ministry of Forests, Nelson, BC.
Cariboo	Impacts of three partial-cutting regimes for mule deer winter range on timber flow (IDF)	Snowdon, B. 1997. Cariboo mule deer prescription simulations. Unpublished internal report prepared for the Cariboo Forest Region by Forest Practices Branch, BC Ministry of Forests, Victoria, BC.
Prince George	Impact of selection management on yield using a local calibration of PrognosisBC (SBS)	Farnden, C. 1997. Calibration and use of FVS for simulating stand dynamics of multi-storied wet belt white spruce-subalpine fir stands near Prince George, B.C. Contract report to the McGregor Model Forest Association, Prince George, BC.
Kamloops and Nelson	Impacts of different levels of root disease on stand development (MS, ICH, IDF)	Kurz, W.A., S.J. Beukema and D.C.E. Robinson. 1999. Simulating root disease impact in selected ecosystems in the Kamloops and Nelson Forest Regions. Prepared by ESSA Technologies Ltd., for Forest Health Unit, Forest Site Management Section Forest Practices Branch, BC Ministry of Forests, Victoria, BC.

3.0 How Prognosis[BC] Works

3.1 Growth Assumptions

Prognosis[BC] is an increment model that can incorporate observed growth into a projection. An increment model accumulates increments over successive time steps (in this case, 10 years), eliminating the need to know the age of the stand.

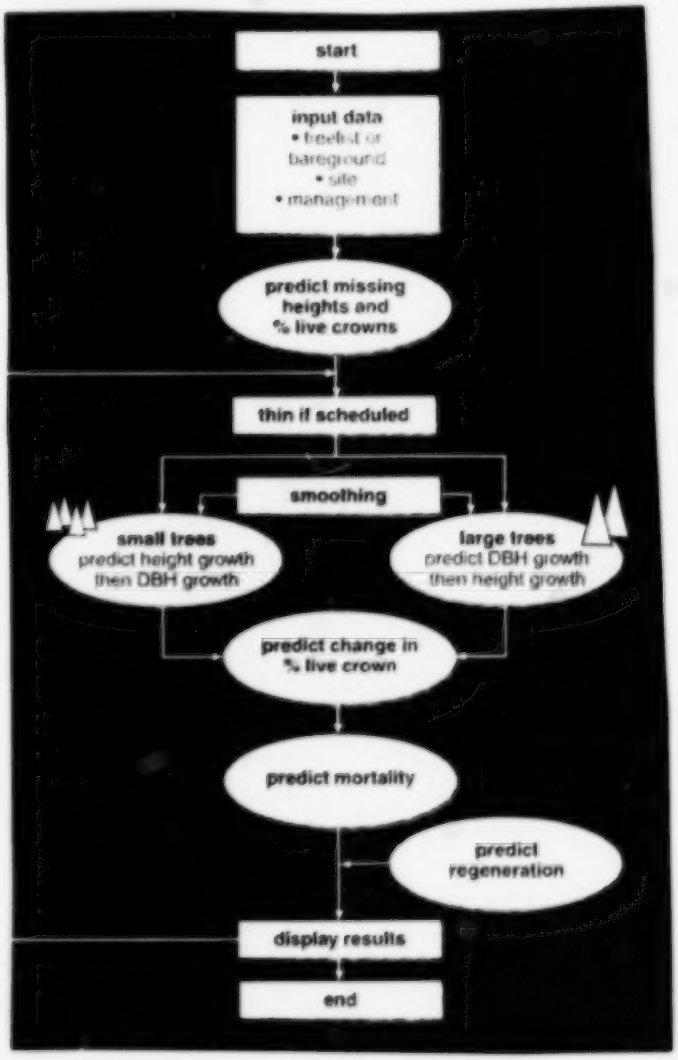
The growth of seedlings and saplings with DBH< 7.5 cm is localized with periodic *height increments*. The predicted growth of stems with DBH ≥ 7.5 cm is localized with periodic *DBH increments*. Other assumptions are listed in the following table.

Factor	Assumption	Impact
Spatial location	The model does not account for the effects of tree location in the stand (evenly spaced vs. clumped) on stand development. Under similar conditions, the model will project the same yields for stands with evenly spaced, clumped, and/or randomly spaced trees.	Cannot simulate difference in tree growth between a group or single tree selection partial cut
Crown ratio	Trees with long crowns grow faster than trees with short crowns	Increase in crown ratio = increase in tree growth
Canopy position	A tree's vigour will increase as its canopy position improves (i.e., when larger trees are removed, but not when smaller trees are removed).	Improved canopy position = increase in tree growth
Stand density	While trees in an open stand grow faster, the overall volume/hectare may be lower than that of a denser stand with less growth per individual tree.	Increase in stand density = decrease in tree growth
Thinning	Thinning response is a function of the reduction in stand density and whether the canopy position of the residual tree changes as a result of thinning.	Increase in position of residual tree and decrease in stand density = increase in tree growth

3.2 Prognosis[BC] Sub-models

Prognosis[BC] is based on sub-models that predict diameter growth, height growth, crown development, mortality, and regeneration for individual trees.

Prognosis^{BC} order of execution



The diameter growth sub-model drives the projection. Prognosis^{BC} uses Kozak's taper equation to calculate volume.

The driving variables for each sub-model are identified in the following table. Site differences between North Idaho and Southeastern BC limit the usefulness of the US regeneration sub-model. The regeneration sub-model is still under development in British Columbia. In the interim, users must specify the amount and composition of the regeneration.

Prognosis^{BC} sub-models and their driving variables[2]

Sub-model	Driving variables
Large Tree Growth (height and diameter)	• past observed growth (height increment) • site descriptors (aspect, elevation, slope, US National Forest, Forest Habitat type) versus tree-based measures • DBH • tree vigour expressed as crown ratio (crown length/total height) • crown competition factor (CCF), a measure of stand density • basal area of large trees (BAL), a measure of canopy position
Small Tree Growth (height)	• height increment (site descriptors such as habitat type, slope, and aspect; height; CCF; and BAL) • DBH (height, top height, and relative height) • crown change (DBH, height, and stand basal area [BA])
Mortality	• DBH • stand BA • relative DBH • DBH increment • maximum BA that the site can sustain
Regeneration	Currently in British Columbia, the user must specify the amount and composition of regeneration

[2] For more information refer to: Robinson, D.C.E. 1997. Prognosis southern interior (SI1.0g) geographic variant description. Prepared by ESSA Technologies Ltd. for B.C. Ministry of Forests, Victoria BC. 178pp.

Section 4

QuickReview

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4.1 QuickReview

QuickReview is for users familiar with Prognosis[BC].

If you have not used Prognosis[BC] before, refer to the tutorials in Sections 5, 6, 7.

QuickReview is a step-by-step outline for using the three components of Prognosis[BC]: DATAprog, SIMprog, and VIEWprog. It is meant for people familiar with Prognosis[BC].

For more detailed information on these programs, refer to the tutorials for each component (Sections 5, 6, 7).

You may find it useful to refer to the online help in DATAprog, SIMprog, and VIEWprog as you work through QuickReview. To use online help:

- in DATAprog, press F1 or click Help
- in SIMprog and VIEWprog, press F1 or choose **Help** from the menu bar.

4.2 DATAprog QuickReview

QuickReview is for users familiar with Prognosis[BC].

For more information, refer to:
- DATAprog Tutorial, Section 5.
- DATAprog online Help through keyboard F1 or onscreen Help

DATAprog translates an existing data file into a Prognosis[BC] treelist based on the information you specify on three forms:

DATAprog Form	Step	
Specify File Names and Template	1	Identify input (data) file and name output (treelist) file
Specify Column Format	2	Reformat the input data file (delimit columns)
Identify Columns, Create Template and Treelist	3	Identify columns to be included in the translation (assign names and units)
	4	Edit data file to correct errors and exclude non-contributing rows
	5	Translate data file to create treelist
	6	Save template

Step 1: Identify input (data) and output (treelist) files

Specify File Names and Template form

1. Verify that **Translate File** is checked and that **Edit Suppose Files** is unchecked.
2. Browse **Input Directory** to select the input data file you will translate.
3. Browse **Output Directory** and name output (treelist) file you will create.
4. Click Next>> to continue.

Step 2: Reformat the input file

Specify Column Format form

1. Specify column format settings corresponding to the format of your input file (e.g., fixed width or character delimiters).
2. Verify that columns are separated accurately.
3. Click Next>> to continue; DATAprog will reformat the input file.

Step 3: Define the columns in the treelist

Identify Columns, Create Template and Treelist form

1. Note the **Over-ride Defaults** and **Grid Edit Options** settings.
2. At minimum, a treelist must include plot ID, tree ID, tree count, species, and DBH. Click on a column header to select column.
3. Under **Assign Columns**, use the list arrows to assign a name and units (where appropriate) to all columns to be included in the treelist.

Step 4: Correct data errors and exclude non-contributing rows

Identify Columns, Create Template and Treelist form

The **Auto-validate** option checks each cell for invalid data and highlights errors in the data file in red typeface.

1. Correct data by:
   - overwriting in cells
   - in cells with codes, using the list arrow to replace the erroneous entry
   - using the **Find/Replace** facility (select a column by clicking its header, then right click the mouse to display editing options).
2. Exclude rows containing text or data not wanted in the treelist by:
   - selecting a column and right-clicking the mouse to use the **Exclude Rows Containing...** or **Exclude Rows Starting With...** edit options
   - select one or more rows and right-clicking the mouse to use the **Exclude Selected Rows** option.
3. When all errors have been corrected (no red text remains), click [Done] to translate. DATAprog will confirm that the translation has finished. Click [OK] to continue.

DATAprog does not recognize corrections until you have moved the cursor out of the corrected cell.

Step 5: Save the template

Identify Columns, Create Template and Treelist form

After the translation is complete, DATAprog will return you to the **Specify File Names and Template** form.

1. Click [Next>>] on this screen and the subsequent screen until you return to the **Identify Columns, Create Template and Treelist** form.
2. To view the edit commands contained in a template, click [Edit] in the **Template** section of the form. Individual commands can be edited or deleted through the **Edit Template Commands** window.
3. To save a template, click [Save] in the **Template** section of the form. In the **Save Template As...** window, type in a name (maximum 8 characters) for the template (e.g., temp1) and click [OK]. Click [Done] to return to the **Specify File Names and Template** form, where you will see the newly created template listed in the **Use Template** dialog box.
4. To use an existing template to translate an input file, select its name using the list arrow in the **Use Template** dialog box on the **Specify File Names and Template** form.

A template saves format and instructions for the input data file and the output treelist. It can be applied to similar input files, thus automating the translation process.

To close DATAprog, click [Quit]. To use the treelist to simulate stand growth, start SIMprog (in the ProgBC folder) on your computer.

4.3 SIMprog QuickReview

QuickReview is for users familiar with Prognosis[BC]

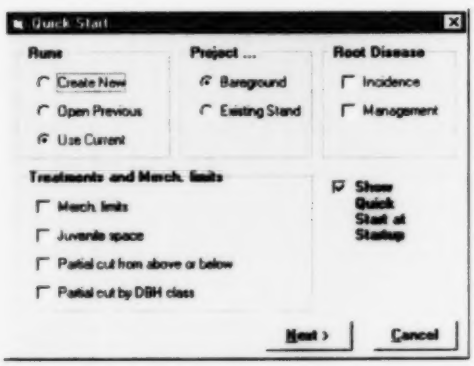
For more information, refer to:
- SIMprog Tutorial, Section 6
- SIMprog online Help through keyboard F1 or **Help** menu

SIMprog projects a stand based on site information, existing stand conditions or bareground assumptions, merchantable volume limits, and management treatments and stand health issues specified in 18 forms. An additional three forms specify how to view results.

SIMprog Form	Step	
Duration and Labels	1	Name and describe the run
Site Information	2	Describe the site
Planted/Natural Regen. Assumptions **Inventory Design** **Tree Data (treelist)**	3	Describe the bareground assumptions or existing stand conditions on which the projection will be based
Merchantable Volume Limits	4	Define the merchantable volume limits for each species in the simulation
Juvenile Spacing **Partial Cutting...from Above or Below** **Partial Harvest Regen. Assumptions** **Partial Cutting...by DBH Class**	5	Define harvesting treatments (optional)
Root Disease Information **Root Disease Inventory Details** **Stump Management**	6	Define forest health issues (optional)
SIMprog main window **Model Run Options**	7	Review run conditions and run the model
Select Runs to Compare **Select Stand Data to Tabulate** **Graph Stand Level Statistics**	8	View results

SIMprog opens with a **Quick Start** option that leads users through the pertinent forms to create or open an existing run.

This feature is described in the SIMprog tutorial, Section 6



Step 1: Name and describe the run

Duration and Labels form

1. In the SIMprog main window, check Delete All.
2. Under the **Runs** menu, select **Create NEW**.
3. On the **Duration and Labels** form, enter a **Run Identifier** (max. 8 characters) and **Run Description** (max. 54 characters).
4. Set the **Projection length** and **Time step**.
5. Click OK.

Step 2: Describe the site

Site Information form

1. Under the **Conditions** menu, select **Site Information**.
2. On the **Site Information** form, enter the appropriate forest region, biogeoclimatic subzone, site series, aspect, slope, elevation, latitude, stand age, and FIZ.
3. Click OK.

Step 3: Describe the stand

You can start a simulation from either bare ground or an existing stand. At this time, Prognosis^{BC} is best used for existing stand simulations.

Bareground simulations

Planted/Natural Regen. Assumptions form

1. Under the **Conditions** menu, select **Projection based on...** ▸ **Planted/Natural Regen.**
2. On the **Planted/Natural Regen. Assumptions** form, select the appropriate establishment regime (natural stand or plantation), and enter values for year of disturbance and regeneration delay.
3. Specify the species composition by **SPH** or **Percentage** (after regeneration is complete) in the **Specify Stocking By** frame.
4. Click OK.

Existing stand simulations

For an existing stand, you will need individual tree data measured in one or more plots. Tree data must be processed as a treelist using DATAprog to ensure its compatibility with SIMprog.

1. Under the **Conditions** menu, select **Projection based on...** ▸ **Existing Stand** ▸ **Inventory Design**.

Inventory Design form

2. On the **Inventory Design form**, enter the plot type(s), plot size, number of plots, and inventory year.
3. Click OK.

Tree Data (treelist) form

4. Under the **Conditions** menu, select **Projection based on...** ▸ **Existing Stand** ▸ **Tree Data**.
5. Follow instructions to locate and open the treelist file you created using DATAprog.
6. Click OK.

Step 4: Define the merchantability limits

Merchantable Volume Limits form

1. Under the **Conditions** menu, select **Merch. Vol. limits**.
2. On the **Merchantable Volume Limits** form, for each species in the simulation specify the minimum usable DBH, top diameter, and stump height.
3. Click OK.

Step 5: Define treatments (optional)

Juvenile Spacing form

Three options for treatment are available: **Juvenile Spacing**, **Partial Cutting from Above or Below**, and **Partial Cutting by DBH Class**. The treatments can be applied individually or in combination. Each can be used only once in a simulation (although **Partial Cutting by DBH Class** offers an option for recurring treatments).

Juvenile spacing

This treatment is a "thin from below."

1. Under the **Conditions** menu, select **Treatments** ▸ **Juvenile Spacing**.
2. On the **Juvenile Spacing** form, enter the desired post-treatment stand condition, and the criterion that will be used to determine when the stand will be spaced (age, year, or top height).
3. Click OK.

Partial cutting from above or below

Partial Cutting... from Above or Below form

1. Under the **Conditions** menu, select **Treatments** ▸ **Partial Cutting** ▸ **from Above or Below**.

2. On the **Partial Cutting...from Above or Below** form, select either a largest first (thin from above) or smallest first (thin from below) thinning strategy.

3. Enter the desired post-treatment stand condition (in terms of either basal area or density), and the criterion that will be used to determine when the stand will be treated (either age, year, QMD, basal area, or top height).

Partial Harvest Regen. Assumptions form

4. If the treatment is expected to trigger a regeneration event, select the **Yes** radio button, and click Assumptions. The **Partial Harvest Regen. Assumptions** form is identical to the **Planted/Natural Regen. Assumptions** form (step 3). Use the same sequence to complete this form:

   - Select the appropriate establishment regime (natural stand or plantation), and enter values for year of disturbance and regeneration delay.
   - Specify the species composition by **SPH** or **Percentage** (after regeneration is complete) in the **Specify Stocking By** frame.
   - Click OK.

Partial cutting by DBH class

Partial Cutting... by DBH Class form

The **Partial Cutting...by DBH Class** form allows you to divide the stand into components that can be treated individually. Stand components are defined in terms of species and diameter limits (e.g., all lodgepole pine 22.5–37.5 cm DBH), and all components must be mutually exclusive. Any portion of an existing stand that is not included in one of the described components *will not be treated*.

1. In the **Target Stocking by DBH Class** table, define the components of the stand (using combinations of minimum DBH, maximum DBH, species) that will be treated, and the stems per hectare in each component post-treatment.

2. Specify the parameter that will be used to control the timing of treatment (either age, year, quadratic mean diameter [QMD], basal area, or top height) and a critical value for that parameter. If this parameter is time-based (age or year), any treatment can occur only once. If it is based on stand measurements, treatment can be set to reoccur each time the critical value is met (i.e., thinning will occur every time the stand achieves a basal area of 50 m^2/ha).

Partial Harvest Regen. Assumptions form

3. If the treatment is expected to trigger a regeneration event, select the **Yes** radio button under Regeneration, and click Assumptions. Fill out the **Partial Harvest Regen. Assumptions** form as described above.

Step 6: Define forest health issues (optional)

Root Disease Information form

Root Disease Inventory Details form

Stump Management form

If you wish to model the effects of root disease:

1. Under the **Conditions** menu, select **Health** ▸ **Root Disease** ▸ **Basic Information**.
2. On the **Root Disease Information** form, specify the type of root disease, stand area, type of information, centre information, and additional output files. You may be required to fill out a **Root Disease Inventory Details** form.
3. Click OK.
4. If you wish to specify any remedial treatment (e.g., apply borate or push stumps), then fill out the **Stump Management** form under the **Conditions** menu (**Health** ▸ **Root Disease** ▸ **Stump Management**).

Step 7: Run the model

Model Run Options form

1. Review the summary run conditions information on the SIMprog main window. Using the Edit buttons, revisit/revise any conditions as necessary.
2. Click Execute. A **Model Run Options** form with the following options will appear:
   - Select **Save Output as ASCII files** if you wish to save text files of summary tables to import into word processors or spreadsheets, or if you wish to use the **US Style Output** option under the **View Results** menu. This option produces detailed output containing, among other things, a list of every step carried out by FVS in the simulation, and any error messages generated by the model.
   - Select **Import Projected Treelist** if you wish to view output by species and DBH class using VIEWprog. Not selecting this option can save time when doing multiple runs, particularly for stands with large treelists and many time steps.
   - Select **Review Actual Keywords** if you are an advanced user and wish edit the keyword file before the run. This option allows expert users of FVS to extend the capabilities of the SIMprog interface.
   - Do not choose **Execute Model Run** if you wish to have the model build the FVS keyword file without actually running the model.

- The **Overwrite Existing Run** option will appear only if another run in the database has the same name as this run. Choosing this option will start the run, replacing the old run with the new one. To avoid overwriting the old run, return to the **Duration and Labels** form to give the new run a different name (on the SIMprog main menu click Edit next to Run ID).

SIMprog will run FVS in a DOS window that will be visible either in front of or behind the SIMprog window. If the DOS window is behind the SIMprog window, you will just see a message box with "Waiting for Model run." When DOS is finished executing, a "Finished - FVS" button will appear in the toolbar and the DOS window may disappear. If it does not, then close the DOS window by clicking on the "close" box in the upper right corner. Windows NT users will not see the DOS window.

Step 8: View the results

The following procedure outlines steps to view output based on stand summary statistics. To view types of output where species composition or diameter distribution is important, see the VIEWprog QuickReview (Section 4.3) or VIEWprog Tutorial (Section 7.0).

1. Under the **View Results** menu, select **Stand Summaries**.

Select Runs to Compare form

2. On the **Select Runs to Compare** form, click to select the available runs for which you wish to review results, and check either table or graph output.
3. Click OK.

Tables

Select Stand Data to Tabulate form

On the **Select Stand Data to Tabulate** form, select the descriptive parameters that you want listed in your output table. Always include at least one of the time-based parameters. The output table will be displayed in a **View Text** window, from which it can be printed or saved.

Graphs

Graph Stand Level Statistics form

SIMprog offers great flexibility for customizing graphical output. On the **Graph Stand Level Statistics** form, select the stand parameters to display on each axis, specify text for axis labels and chart titles, control the appearance of line markers and grids, and select printing options. Note that some option changes will result in immediate changes in the displayed chart, and others do not appear until you click Apply.

4.4 VIEWprog QuickReview

QuickReview is for users familiar with Prognosis[BC].

For more information, refer to:
- VIEWprog Tutorial, Section 7
- VIEWprog online Help through keyboard F1 or **Help** menu

VIEWprog displays stand (density) and stock (merchantable volume) information by species and DBH class for each time step in a SIMprog projection. This information can be displayed as tables, which can be saved or printed, and charts that can be pasted into another application or printed. Users specify the format of information on six forms.

VIEWprog Form	Step	
	1	Open VIEWprog
Stand Structure Reporting System	2	Select run and report type (stand & stock tables or species composition)
Stand & Stock Tables for <Run Name>	3	Specify stand or stock table, year(s) to display, and DBH class parameters
Report Description	4	Select table or chart, then view, edit, and print or export
Chart Print Preview		
Species Composition Through Time for <Run Name>	5	Species composition chart and table: select statistic to plot, edit, and print or export
Report Description		

Step 1: Open ViewProg

VIEWprog can be opened in two ways:

- double click on the VIEWprog (in the ProgBC folder) on your computer
- from the SIMprog main window, under **View Results** menu, select **By Species and/or DBH Class**

Step 2: Select run and report type

Stand Structure Reporting System form

1. On the **Stand Structure Reporting System** form, select the run(s) you wish to display and check the desired report type (stand & stock tables or species composition). Note that only runs for which projected treelists were imported during execution will show as available.
2. Click OK.

Step 3: Specify stand or stock table, year(s) to display, and DBH class parameters

Stand & Stock Tables form

1. If you selected **Stand & Stock Tables** in Step 2, a **Stand & Stock Tables** form will open to a preview window with a default chart of stand density. Click Refresh to update the chart for the selected run and after making any changes to the form.
2. Specify the desired statistic (density or merchantable volume), year(s) to display, and the DBH class characteristics.

Step 4: Select table or chart, then view, edit, and print or export

1. To produce tabular output, click View Reports on the **Stand and Stock Tables** form.

Report Description form

Edit the report title by overtyping on the **Report Description** form and click OK to generate the desired table.

Use the buttons along the bottom of the table window to size, print, or export the report to another application.

2. To produce graphic output, click View Charts on the **Stand and Stock Tables** form.

Chart Print Preview form

Customize the chart titles, y-axis units, grids on the **Chart Print Preview** form and select whether to print or save the chart to another application.

Step 5: Species composition chart and table: select statistic to plot, edit, and print or export

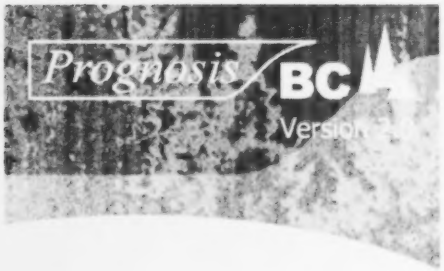
Species Composition form

1. If you selected **Species Composition** in Step 2, a **Species Composition Through Time** form will open.
2. Specify the desired statistic to display; edit chart titles, y-axis units, and grids; and select whether to print or save the chart to another application.

Report Description form

3. To create a table, click View Report. On the **Report Description** form, edit the title by overtyping and click OK to generate the table.

Use the buttons along the bottom of the table window to size, print, or export the report to another application.



Section 5

DATAprog Tutorial

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5.1 Introduction to DATAprog

DATAprog uses the same editing features as most popular spreadsheet packages (e.g., Excel).

Detailed editing instructions are ***not*** included in this tutorial. You should be familiar with editing spreadsheets before using DATAprog.

DATAprog is the data translator component of Prognosis^{BC}. The DATAprog tutorial will help you understand the mechanics of translating an input data file into a format that the model can use. Users who want a better understanding of DATAprog should attend a Prognosis^{BC} training course.

Data Inputs

The data needed to run Prognosis^{BC} is typically derived from operational cruises or permanent sample plots.

DATAprog translates an imported data file into a "treelist" file format that can be used by SIMprog – the Prognosis^{BC} component that simulates stand growth. The minimum information needed in a treelist to be used by SIMprog is plot ID, tree ID, tree count, species, and DBH.

Input files must be text files (i.e., non-binary) with one record of data per tree, and columns must be either fixed width or delimited by spaces or commas.

It is also possible (but time-consuming) to enter data directly into the DATAprog data grid to create a treelist. For more information on creating a new input file, refer to DATAprog's online Help, which is available when DATAprog is running.

Data Translation

DATAprog takes existing data files of almost any format (one record per tree) and translates them into a treelist.

The translation process involves:

- selecting the input data file
- naming the treelist output file that will be created
- specifying how the input file columns are delimited, and identifying columns and their units
- correcting errors in the data
- excluding unwanted data.

DATAprog uses four forms to request information about a translation:

The **Set Defaults** form appears the first time you use DATAprog and is used to identify the Input and Output file directories.

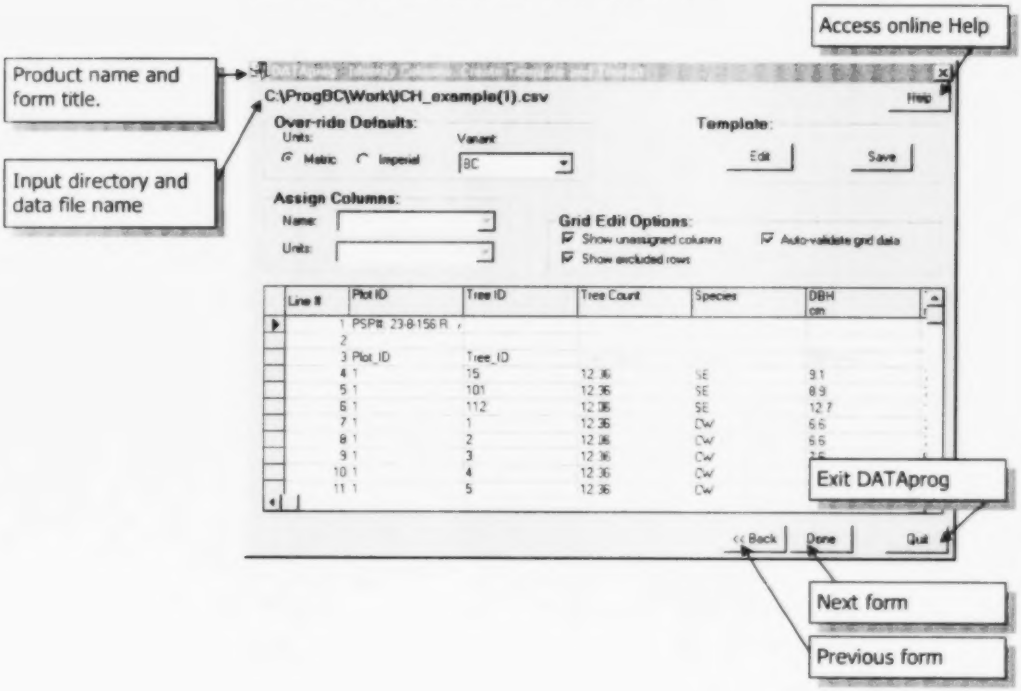
The **Specify File Names and Template** form asks you to identify the names and locations of input and output files and specify whether a template is to be used in the translation.

The **Specify Column Format** form asks you to define the format of the input file

The **Identify Columns, Create Template and Treelist** form asks you to identify columns, specify their units, and activate translation of the data file to the treelist.

By filling out these forms you create a list of commands that tell DATAprog how to translate the input data file into a treelist.

The **Identify Columns, Create Template and Treelist** form shown below illustrates key features of the DATAprog forms.



5.2 Tutorial Overview

The tutorial is intended for people new to DATAprog.

Users already familiar with DATAprog may wish to go to the QuickReview, Section 4.2.

Lesson 1: Setting Defaults

How to set and change defaults, and how to override defaults without changing them. Defaults must be specified when running DATAprog for the first time.

Lesson 2: Translating a File

How to create a treelist. How to specify column delimiters, identify columns and units, edit the data grid to correct data and exclude specific rows and/or columns, validate the data, and complete the translation.

Lesson 3: Using Templates

How to create and edit an existing template.

Lesson 1: Setting Defaults

Lesson Objective

This lesson describes how to change the default settings in DATAprog.

Overview of Steps

1. Start DATAprog.
2. Set DATAprog defaults:
   - select the **Input Directory**
   - select the **Output Directory**
   - click Set Defaults.

Step 1: Start DATAprog

You can access DATAprog in two ways:

- through the DATAprog folder in the ProgBC folder on your computer (double-click on the DATAprog32.exe icon)
- through the **Start** menu (**Start** ▸ **Programs** ▸ **ProgBC** ▸ **DATAprog**).

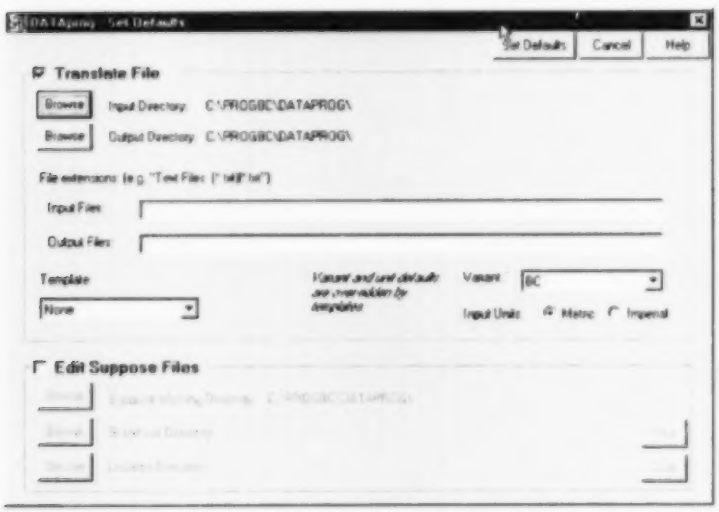
If you have not yet installed the Prognosis[BC] software, refer to Section 1.4, Installing Prognosis[BC].

Step 2: Set DATAprog defaults

The first time you use DATAprog (after installing Prognosis[BC]), it will open to the **Set Defaults** form. You will use this form to view some default settings and to specify the default input and output directories (i.e., the folder(s) where you will keep your data files and the treelists that DATAprog will create from them).

The **Set Defaults** form opens with the following preset defaults:

Program Use	Translate File checked; Edit Suppose Files unchecked
Input Directory	Working directory specified during installation (C:PROGBC\DATAPROG\)
Output Directory	Working directory specified during installation (C:PROGBC\DATAPROG\)
Template	None
Variant	BC
Input Units	Metric

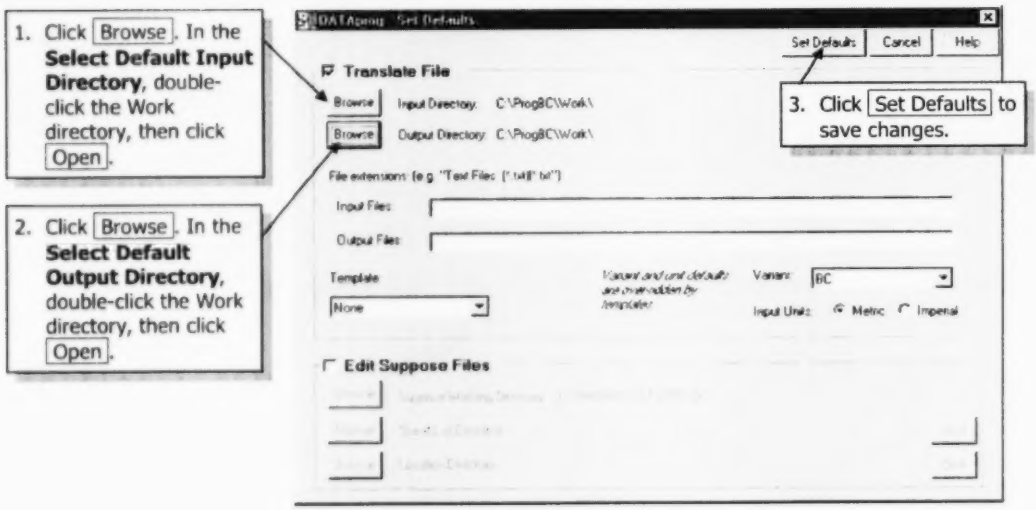


In this step, you will set different input and output directories as follows:

1. In the **Translate File** frame, click Browse beside **Input Directory**. In the **Select Default Input Directory** dialog box that appears, move up one level to the **ProgBC** directory. Double-click the **Work** directory, and click Open. The program will return you to the **Set Defaults** form, and display the default **Input Directory** as (**C:\ProgBC\Work**).

2. Under **Translate File**, click Browse beside **Output Directory**. In the **Select Default Output Directory** dialog box move up one level to the **ProgBC** directory. Double-click the **Work** directory, and click Open. The **Set Defaults** form will now display the default **Output Directory** as **(C:\ProgBC\Work\)**.

3. Click Set Defaults at the top of the form. This will set the selected input and output directories and move you to the next DATAprog form: **Specify File Names and Template**.

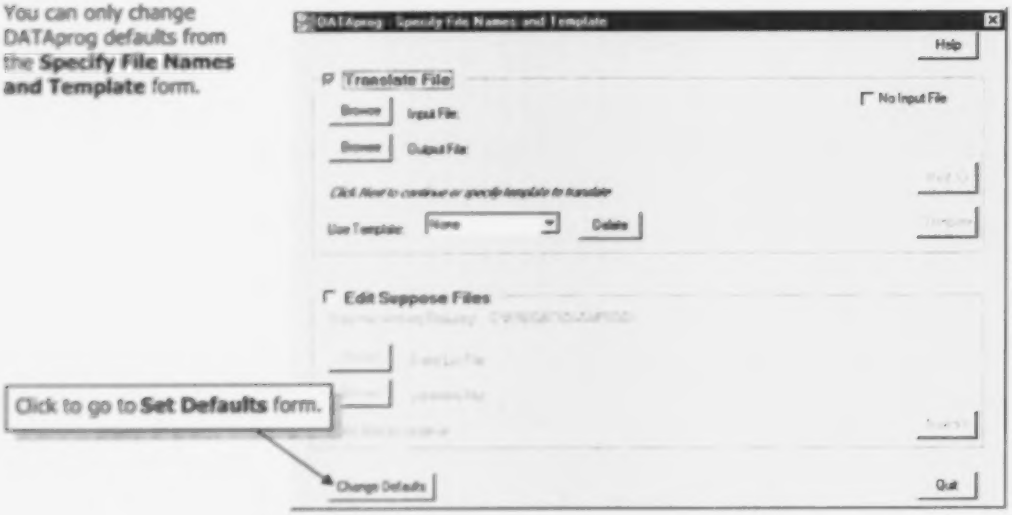


In subsequent runs of DATAprog, the program will open with these input and output directories and other preset defaults.

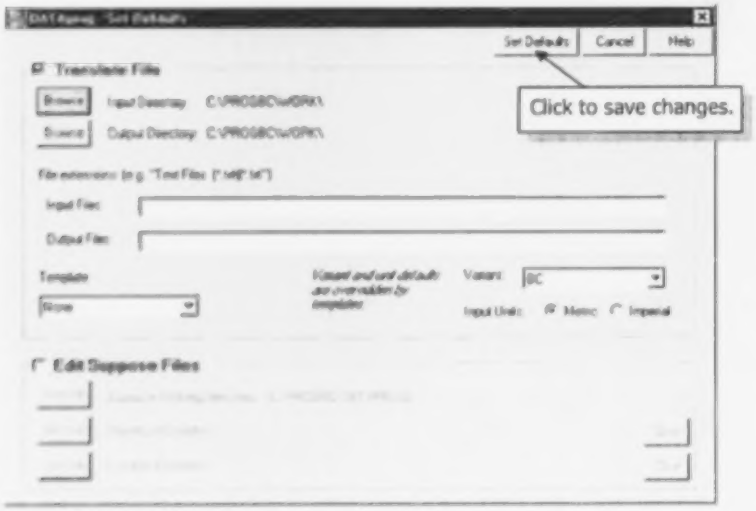
Changing DATAprog defaults

You can only change DATAprog defaults from the **Specify File Names and Template** form.

You can change the defaults in DATAprog only from the **Specify File Names and Template** form. Clicking Change Defaults takes you to the **Set Defaults** form.



The **Set Defaults** form will show the default input and output directories you set in Step 2 [1, 2, 3]. When you have completed any desired changes, click Set Defaults to save the new settings.



Lesson 2: Translating a File

Lesson Objective

This lesson shows you how to translate an existing data file into a treelist using the sample data file included in the Prognosis^{BC} installation package.

This lesson uses the defaults set in Lesson 1.

Lesson 1 must be completed before starting Lesson 2.

Overview of Steps

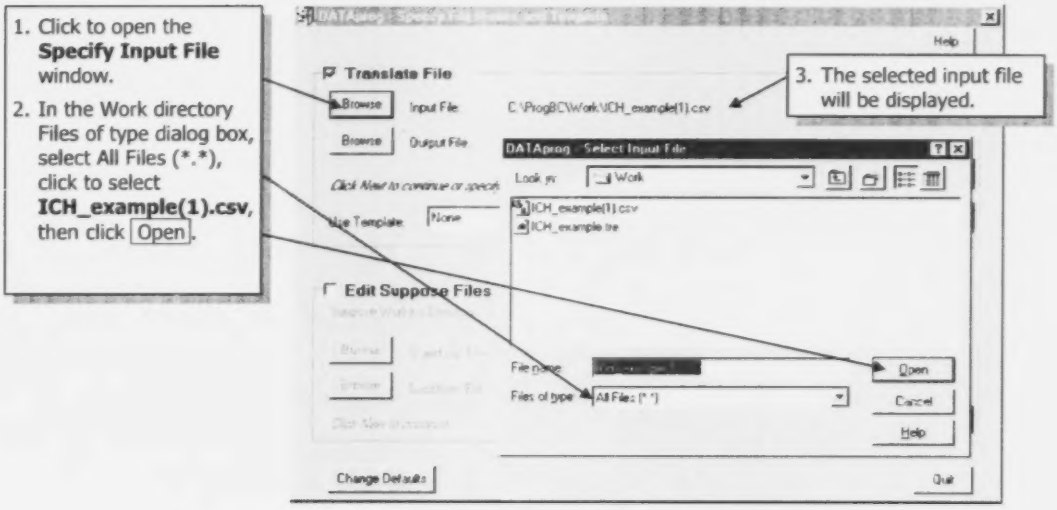
1. Specify the input data file.
2. Name the treelist (output file).
3. Specify how columns are delimited.
4. Identify columns and assign units to each.
5. Edit the data grid.
6. Validate the data and translate the file.

Step 1: Specify the input data file

In this step you specify the name of the input file you want to translate.

After the initial run following installation, DATAprog opens at the **Specify File Names and Template** form.

1. In the **Specify File Names and Template** form, click Browse beside **Input File**.
2. The **Select Input File** window will open to the **Work** directory. In the **Files of type** dialog box select **All Files [*.*]**, then click on the sample data file: **ICH_example(1).csv**
3. The selected input file will now appear on the **Specify File Names and Template** form (**C:\ProgBC\Work\ICH_example(1).csv**).



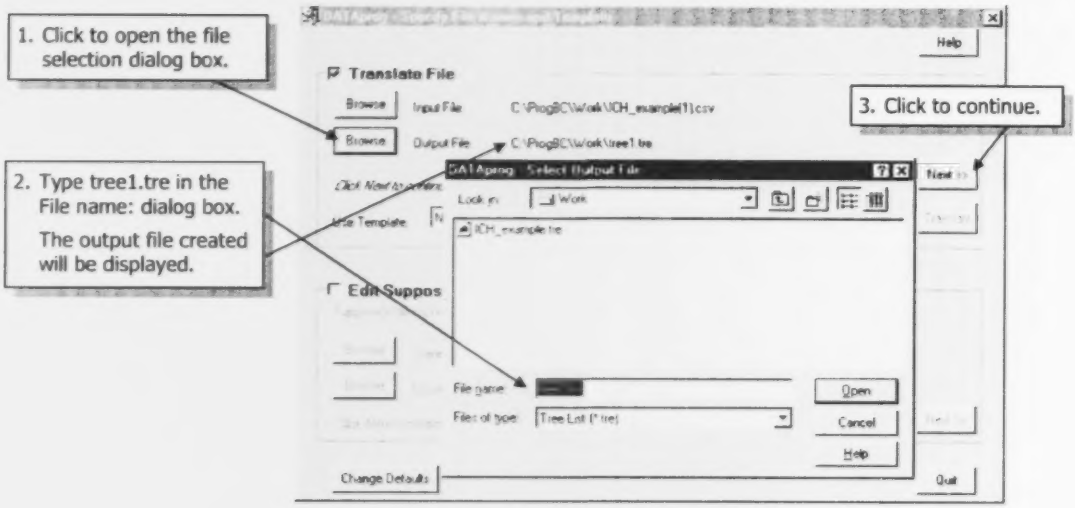
Step 2: Name the treelist

In this step you specify the name of the treelist you will create.

1. In the **Specify File Names and Template** form click Browse beside **Output File**.
2. In the **Select Output File** window, you will see a **File name**: dialog box. Type in **tree1.tre** and click Open.

   DATAprog will tell you that C:\ProgBC\Work\tree1.tre does not exist and will ask if you want to create it. Click Yes.

   The file you created will be displayed on the **Specify File Names and Template** form (**C:\ProgBC\Work\tree1.tre**).
3. Click Next>> to continue.



Step 3: Specify column delimiters

In this step, you will specify how columns in your input data file are delimited.

Delimiters are the spaces or characters that separate columns of data in the input file. You need to tell DATAprog what type of delimiters to look for so that it can separate the columns for the treelist.

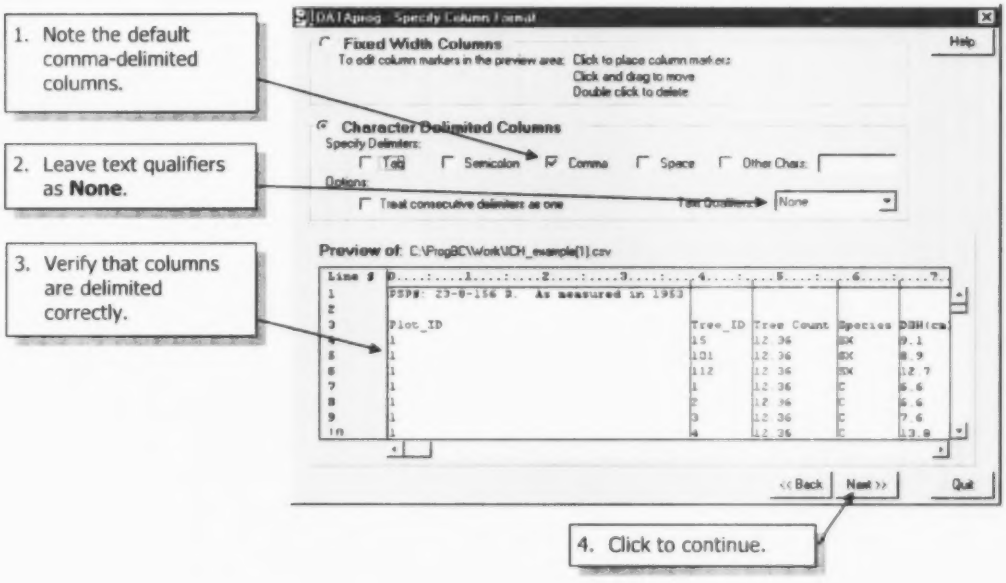
1. By default, DATAprog uses comma-delimited columns.

   Where input data files have fixed-width columns, you would click the **Fixed Width Columns** radio button and follow the instructions on the form to delimit fixed-width columns.

2. Text qualifiers are required when the input data file contains text in quotes. Specifying text qualifiers removes the quotation marks from text in the input data file. Leave **Text Qualifiers** set as "None."

3. Examine the **Preview of** frame to verify that columns have been delimited correctly. Use the scroll box to scroll down through the file.

4. Click Next>> to continue.



Step 4: Name columns and assign units

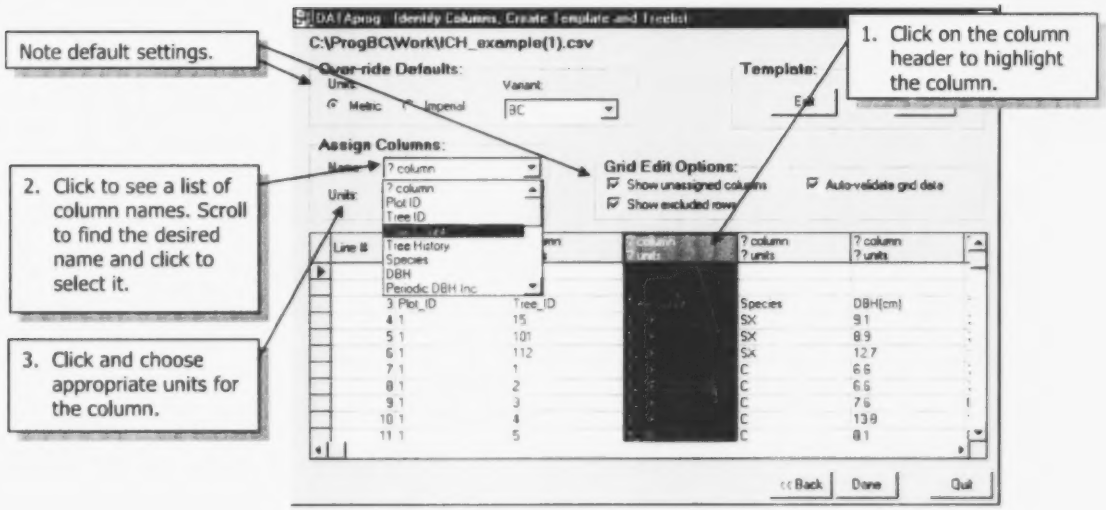
In this step you specify the kind of data in each column of the input file.

The **Identify Columns, Create Template and Treelist** form displays the default **Units** (Metric) and **Variant** (BC) in the **Over-ride Defaults** frame. All options are checked in the **Grid Edit Options** frame.

Note that the data columns in the data file are not named and have no units assigned. Five columns are mandatory for all treelists: plot ID, tree ID, tree count, species, and DBH. The file will not validate unless these have been identified.

1. Select the third column of data (the fourth column in the grid) by clicking on its header. This will display "? column" in the **Name** list box of the **Assign Columns** frame.

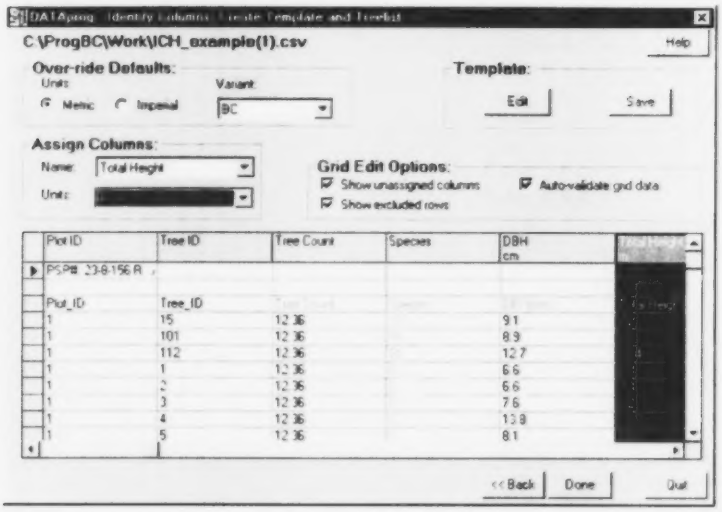
2. Scroll down the **Name** list box to **Tree Count** and click to select and rename the column. In the same way, name data column 1 (Plot ID), 2 (Tree ID), 4 (Species), 5 (DBH), and 6 (Total Height).



3. Assign measurement units to the columns in the data grid. First, select a column and then click on the **Units** list box for a list of appropriate units. Click to select the desired units for the column. When no units are appropriate for an identified column (e.g., Plot ID), the **Units** list box will remain blank.

   Assign appropriate units to the columns you have named – **DBH (cm)** and **Total Height (m)**.

The **Identify Columns, Create Template and Treelist** form should look like the following after columns have been named and units assigned (the file is scrolled right to make the Total Height column visible):



4. **Do not** click Done; continue to Step 5 *Edit the data grid.*

Step 5: Edit the data grid

You should be familiar with editing spreadsheets before proceeding.

In this step you will edit cells in the data grid to correct errors, and exclude rows from the treelist without deleting them from the input file.

Be very careful when editing as there is no "undo" function. If you make an error in editing the file, you will need to go back to step 2 and begin again.

Editing Data

Be careful when editing as there is no "undo" function.

Data is edited on the **Identify Columns, Create Template and Treelist** form. DATAprog's default **Auto-validate grid data** option automatically validates each cell as data are entered or corrected, and displays any data errors in red text. Errors can be corrected by overwriting, selecting a replacement code from a list box, or using a **Find/Replace** facility. The Find/Replace facility is used to correct repeated errors.

Overwriting Cells

DATAprog does not recognize a correction until the cursor has been moved out of the corrected cell.

1. Under the **Species** column, you will see three cells with the code "SX." Change the first cell (row 4) to species code "SE" by clicking on the cell and overwriting. Move the cursor out of the cell to see the correction. **Note that you cannot undo this action. You can only overtype the cell with the previous code.**

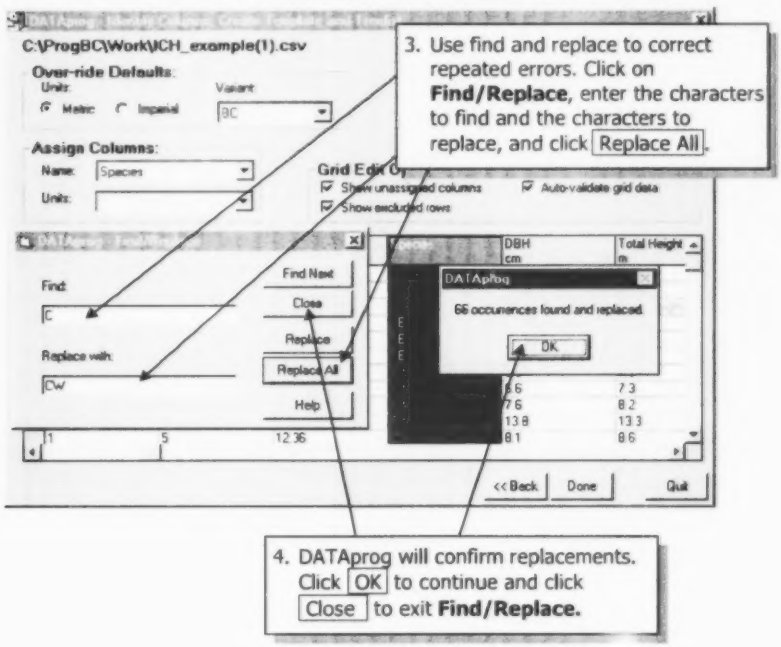
Selecting from a List Box

2. You can also change a cell code by selecting a replacement from a list box. Click on the next cell containing "SX" (row 5), then click again on the list arrow that appears. This will display a list of species codes; from the list, click on "SE." When you move the cursor out of the cell, "SE" will register. Repeat for row 6. **Note that you cannot undo this action. You can only overtype the cell or choose another code from the list.**

Find and Replace

3. Replace the incorrect species code "C" (flagged by DATAprog in red text) with the correct code "CW." Click on the **Species** column name to highlight that column, then right-click to display the list of editing options. Click on **Find/Replace**, enter "C" in the **Find** dialog box and "CW" in the **Replace with** dialog box. Click Replace All.

4. DATAprog will confirm the number of occurrences found and replaced. Click OK to continue and Close to exit **Find/Replace**.



Excluding Rows

You can exclude rows from the data file in two ways:

- by specifying selected rows to be excluded
- by specifying rows that contain a specific character string to be excluded.

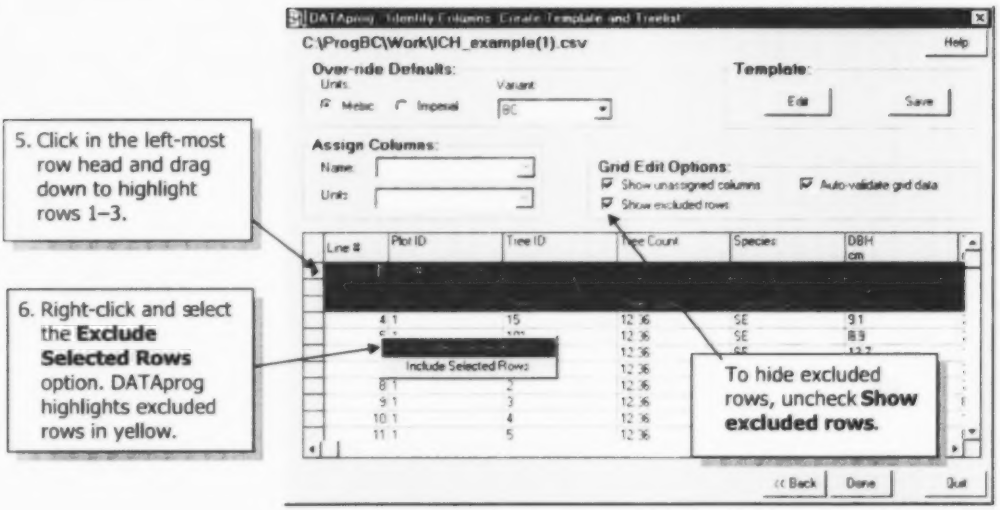
Excluded rows are not deleted from the file, but they are excluded from the translation and the subsequent treelist (final output file).

Exclude Selected Rows

Blank rows, and rows that contain text, dates, stamps, or other erroneous data must be excluded from the data file before translation.

5. Select the row you wish to exclude by clicking on its row head in the left-most column of the grid. Click and drag to select several rows. For this exercise, select rows 1 through 3.

6. Right-click to display the editing options, and click on **Exclude Selected Rows**. The text in the selected rows will turn yellow. If you wish to hide excluded rows, uncheck the **Show excluded rows** box in the **Grid Edit Options** frame. Note that the only way to undo this action is to reselect the rows, right-click, and select **Include Selected Rows**.

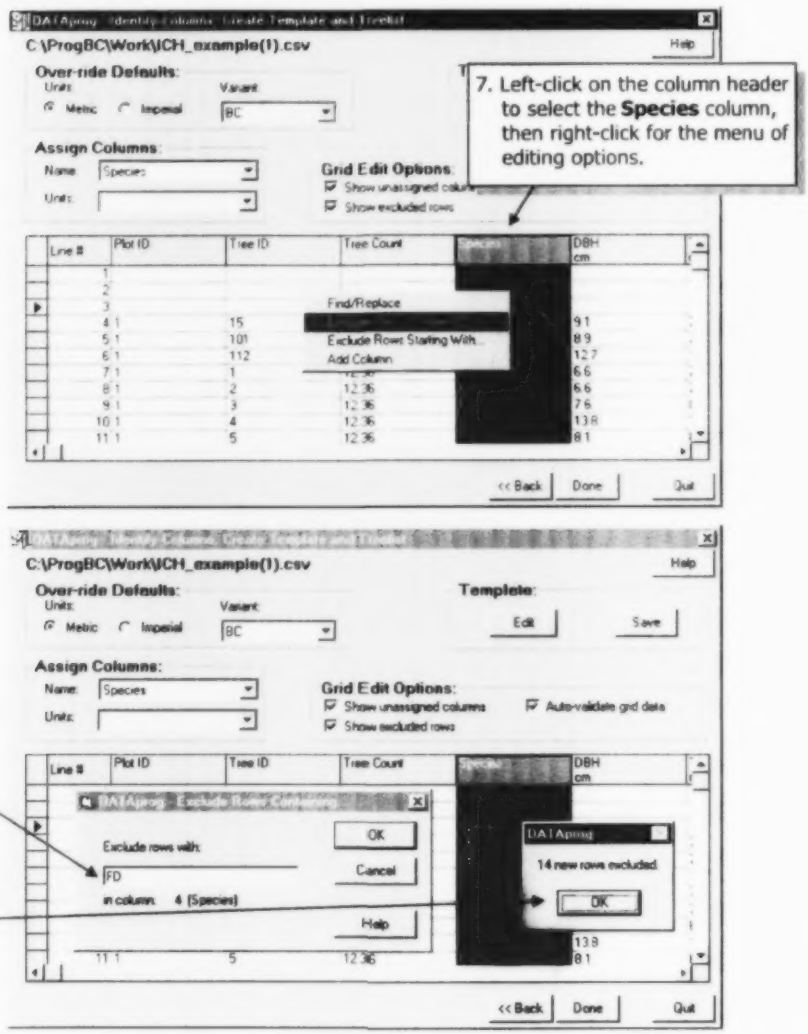

5. Click in the left-most row head and drag down to highlight rows 1–3.
6. Right-click and select the **Exclude Selected Rows** option. DATAprog highlights excluded rows in yellow.
To hide excluded rows, uncheck **Show excluded rows.**
C:\ProgBC\Work\ICH_example(1).csv
Over-ride Defaults:
Template:
Assign Columns:
Grid Edit Options:
Include Selected Rows
Back
Done
Quit

Exclude Rows Containing...

It is possible to exclude all rows containing a specified character string, such as a species code.

7. Select the Species column, then right-click for the list of edit commands. Select **Exclude Rows Containing...**.

8. Enter "FD" in the **Exclude rows with** dialog box and click OK. A window will appear to report 14 new rows excluded. Click OK. The text in the excluded rows will turn yellow.



Exclude Rows Starting With...

Unlike **Exclude Rows Containing...**, which searches for an exact match of the entered character string before excluding a row, **Exclude Rows Starting With...** just looks for the specified character string at the start of a cell. For example, by excluding rows starting with "P" in the Species column, this command would enable you to exclude all pine records from the treelist.

Exclude Columns

To exclude columns from the data file, leave them unassigned (refer to Step 4).

Adding Data

New data records (rows) can be added by entering data into the blank row found at the very bottom of the list of scrollable records.

New columns can be added by selecting any column and right-clicking to access the **Add columns** option.

Step 6: Validate and translate

This step validates that all mandatory formatting of columns and units has been completed and translates the data file into a treelist.

Data Validation

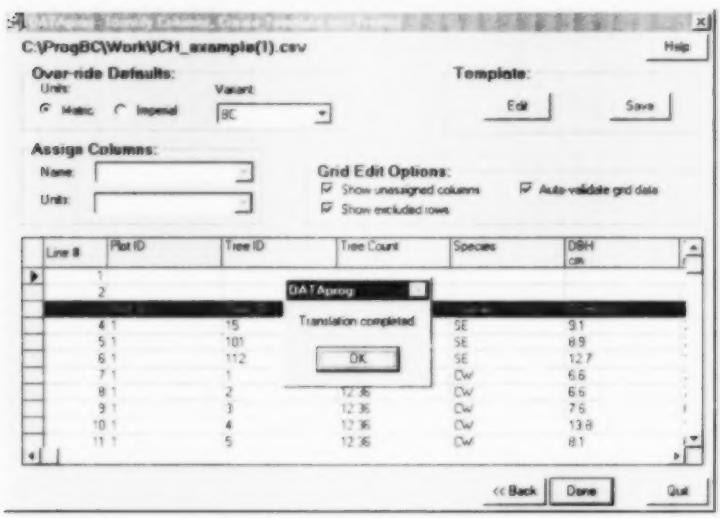
The DATAprog validation process identifies:

- empty records
- missing columns
- duplicate columns
- columns with unidentified units
- incorrect codes (e.g., species)
- errors (displayed as red text).

DATAprog has an **Auto-validate grid data** option on the **Identify Columns, Create Template and Treelist** form. When auto-validate is checked, DATAprog validates each cell as data are entered or corrected. When unchecked, data are validated after Done has been clicked. DATAprog defaults to **Auto-validate**; uncheck this feature if validation seems slow.

1. Scroll through the files and correct records with red text using DATAprog's data editing options. (You will have done this by working through Step 5.) Click Done.

   DATAprog will check the data file to verify that all errors have been corrected and that all rows and columns that are not required have been excluded. In this example, the file translates successfully.



In some cases, the file may not translate and DATAprog will display a message box noting the source of the problem (e.g., **Invalid Tree Count**

if there is a text label in this data column, or **Invalid Species Code**). A check of the data file shows the problem cells in red text. You can correct the problem by overwriting cells, excluding rows, or using the Find/Replace Function as described earlier. When all corrections have been made, click [Done] to validate the format and run the translation.

2. Click [OK]. This will return you to the beginning of DATAprog—the **Specify File Names and Template** form.

3. Click [Next>>] until you are back at the **Identify Columns, Create Template and Treelist** form, then continue to Lesson 3 to learn how to create and use a template.

Lesson 3: Using Templates

Lesson Objective

This lesson shows you how to create, edit, and use a template.

A template saves input and output file format information that can be applied in translating other files. Using a template automates the translation process.

Overview of Steps

1. Create a template.
2. Edit a template.
3. Use a template.

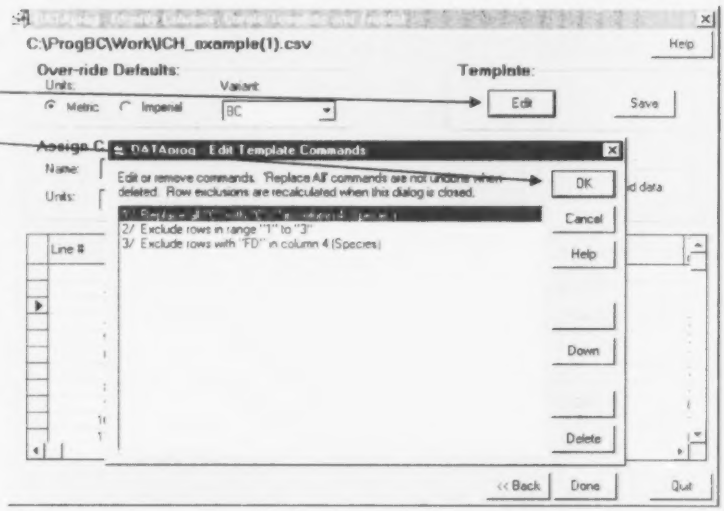
Step 1: Create a template

In this step you will create a template.

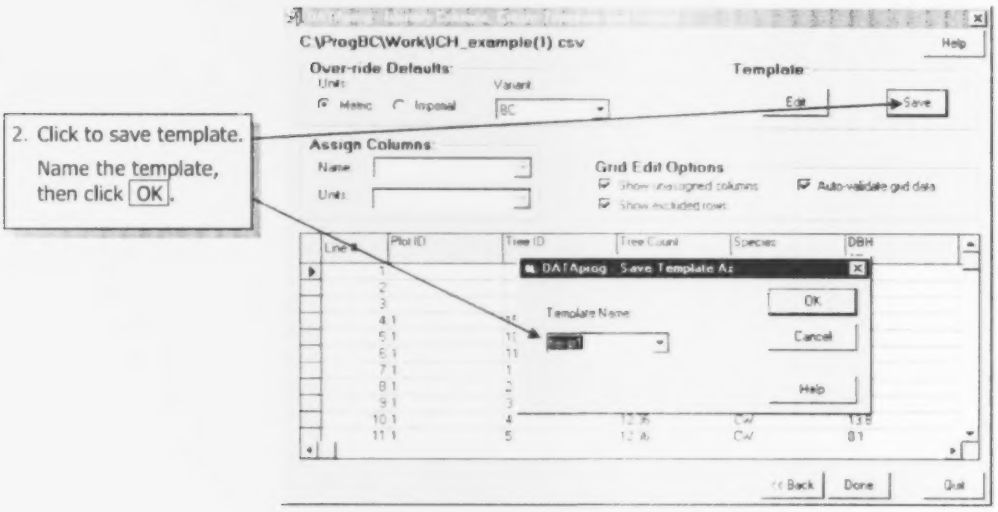
1. A template is comprised of the commands you gave DATAprog on how to format the data file. To see these commands, click Edit in the **Template** frame of the **Identify Columns, Create Template and Treelist** form.

1. When the translation has completed (Lesson 2), click to see template commands.

   If you agree with the commands, click OK.

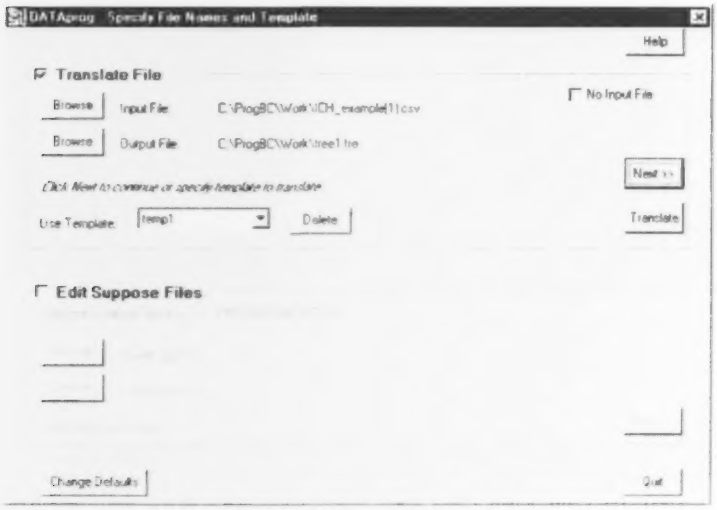


2. Click Save to save the template. This will take you to the **Save Template As...** window. In the **Template Name** dialog box, type a name (maximum 8 characters) for the template (e.g., temp1), then click OK to save the name.



3. Click Done. DATAprog will return to the **Specify File Names and Template** form, where you will see **temp1** displayed in the **Use Template** list box.

   At this point, you would normally quit, but before leaving DATAprog, continue with Step 2 *Editing a template*.



Step 2: Editing a template

This step begins with the **Specify File Names and Template** form where you ended Step 1.

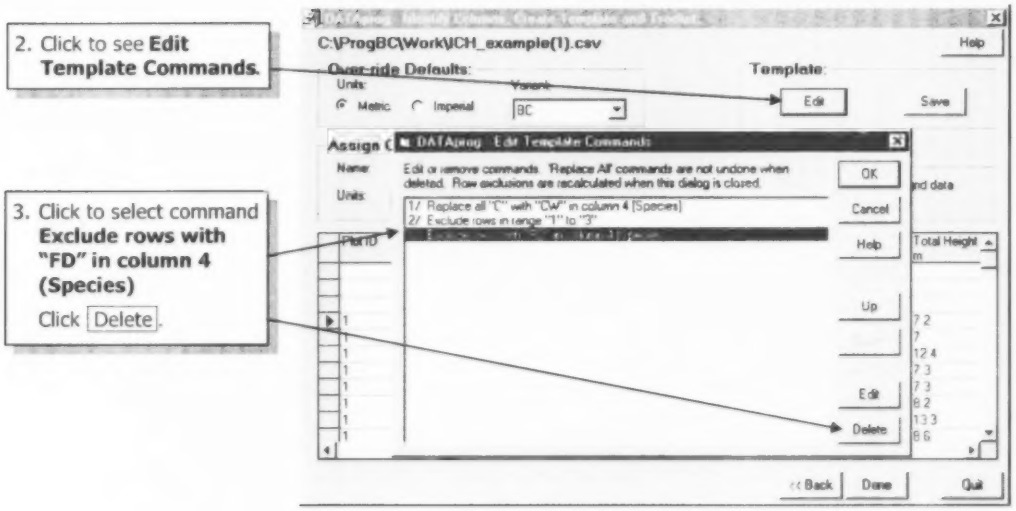
When the input data file format is similar to, but does not match the exact format of an existing template, you can modify the existing template.

1. In the **Specify File Names and Template** form, select the name of the template you wish to use in the **Use Template** list box, and click Next>>.

   This will take you to the **Specify Column Format** form. Click Next>> again to reach the **Identify Columns, Create Template and Treelist** form.

2. Click Edit in the **Template** frame to display the **Edit Template Commands**. The edit options are different for different types of commands. Place the cursor over a command to see the available edit options. For example:

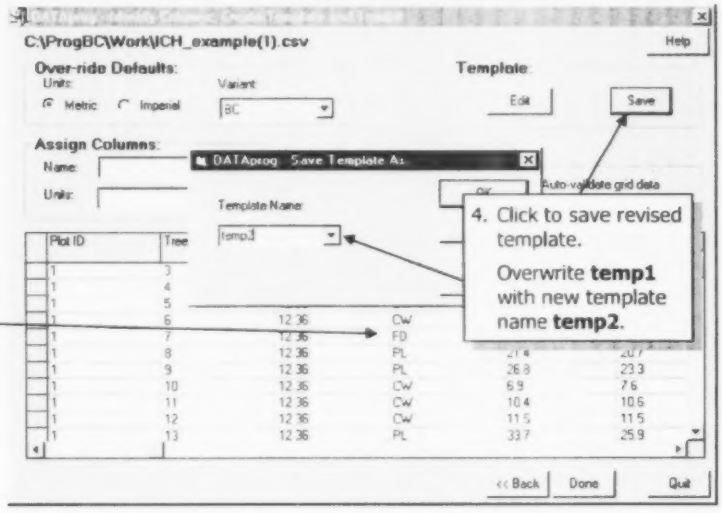
   - The "Replace all" commands can be removed from the template by clicking Delete, but cannot be edited. **Note:** deleting the command from the template does not undo it from being applied to the data file.
   - The "Exclude rows" commands can be edited or removed from the template using the Edit or Delete buttons.



3. Click on command 3: [Exclude rows with "FD" in column 4 (Species)], then click Delete. Click OK to exit from the template commands. On the **Identify Columns, Template and Treelist** form, the rows with FD will no longer show as excluded in yellow text.

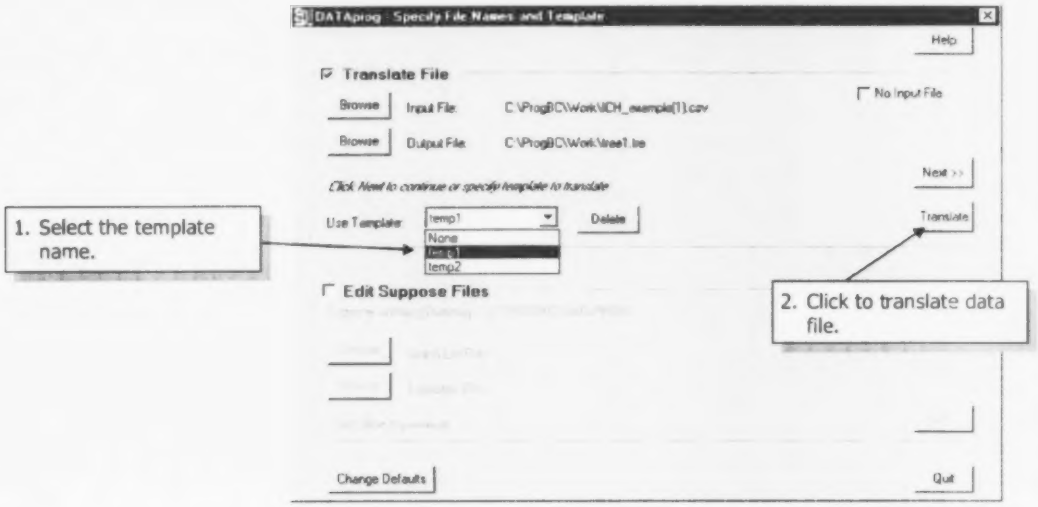
Remember to save the new template under a new name.

4. Click Save and overwrite **temp1** with a new template name, **temp2**.



Step 3: Use a template

1. To select a template, click the arrow in the **Use Template** list box on the **Specify File Names and Template** form (DATAprog's opening screen).
2. Click Translate to create the treelist.



3. As discussed in Lesson 2, Step 6, DATAprog automatically validates the input data. If no errors are found, it creates the treelist and displays a confirmation message. Otherwise, errors are highlighted in red and error messages (such as Invalid Species Code) are displayed.
4. Following the process outlined in Lesson 2, Step 5, edit the data file until all errors have been corrected and the file has successfully completed translation.

Section 6

SIMprog Tutorial

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6.1 Introduction to SIMprog

SIMprog is a Windows®-based interface that controls Prognosis^{BC} simulations and makes it unnecessary for model users to learn a complex set of commands or *keywords*. The interface consists of several forms, which prompt users for the information necessary to build a "run" (e.g., stand, site, and treatment data). The model uses this information to build a properly formatted keyword set, then initiates the simulation and provides several options for viewing the results. The SIMprog interface permits a wide range of silviculture planning scenarios, but does not support the full range of available keywords in the Prognosis^{BC} model. Users wanting to explore more in-depth applications of Prognosis^{BC} than those presented in this Guide should contact the Growth & Yield Model Support Centre:
tel: (604) 739-9806; e-mail: gymodels@istar.ca

Forms can be accessed through the Menu system, which the tutorial will follow (Section 6.3), or through a prompted Quick Start system (Section 6.2). It is recommended that first-time users of SIMprog work through the tutorial to benefit from the structured explanation of each form.

Data Inputs

The minimum information needed to execute a simulation with SIMprog includes:

- Ecological site data, which is used to infer the productivity of the site and to assign growth rates to the species present. This includes site series, aspect, slope, elevation, and latitude.
- A description of the stand, which can be either existing or newly established following a clearcut. Simulations based on an existing stand require an input file or *treelist* that contains individual tree data from sample plots in the actual stand. Treelists are typically derived from operational cruises or permanent sample plots. See the DATAprog tutorial for more information on preparing treelists.
- Merchantable volume limits, duration of projection, and projection time step (a discrete fixed interval at which treatments can occur and for which current stand condition is reported—usually 10 years).

The following additional information is required to simulate any cutting treatments such as thinnings, partial harvest, or clearcut:

- type of cutting (e.g., juvenile spacing, commercial thinning from above or below, thinning selectively by species and diameter class)
- timing of thinning (e.g., calendar year; years since start of simulation, or time when the stand achieves a desired condition such as a specific quadratic mean stand diameter, basal area, or top height).

To simulate the presence of root disease, information is needed on the type of disease, size and distribution of disease centres, and any intended methods of treating the disease (see Lesson 6 for more details).

Simulation Results

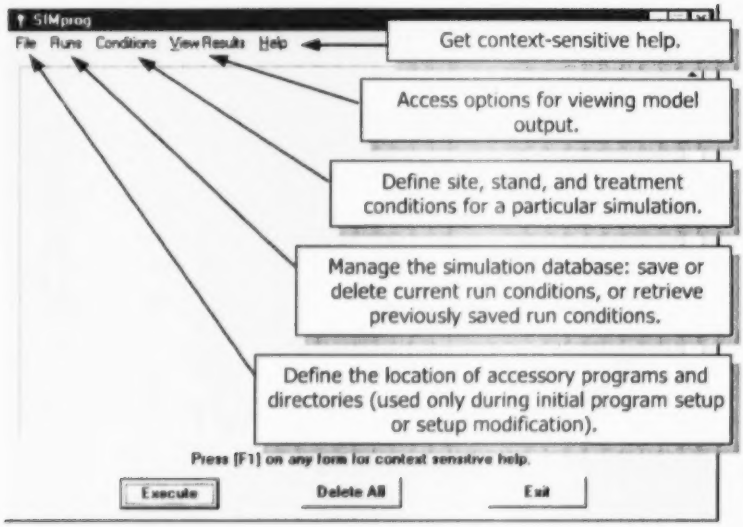
SIMprog provides three types of output for viewing simulation results:

- Stand-level summaries of various stand attributes (e.g., volume, density) can be viewed in tabular or graphic format. Users can design custom output tables with various stand descriptive parameters. Parameters can be plotted against time or another variable such as top height.
- Stand and stock tables, and species composition over time can be plotted in VIEWprog.
- A highly detailed text file (US Style Output) can be produced that documents how the simulation was processed, the keywords used, and how various events were scheduled. It includes a series of summary tables describing the simulation results.

SIMprog Interface

The SIMprog main window starts as a blank form (shown below) with a set of menu selections across the top and three buttons along the bottom.

File	The File menu defines the location of accessory programs and directories (used only during initial program setup or setup modification).
Runs	The Runs menu contains functions for creating and naming new runs, re-opening past runs, saving current runs, or deleting old runs that are no longer needed.
Conditions	The Conditions menu is used to describe site and stand conditions, define treatments, and quantify forest health problems for a given simulation run.
View Results	The View Results menu is used to plot simulation results in a variety of graph or table formats.
Help	When working in any form, specific information regarding the data being requested is available through the Help menu or by clicking the F1 key.
Execute	Initiates a simulation, provided that the minimum required information has been entered.
Delete All	Clears the current set of conditions so that a new set can be started.
Exit	Quits SIMprog.


SIMprog
File Runs Conditions View Results Help
Get context-sensitive help.
Access options for viewing model output.
Define site, stand, and treatment conditions for a particular simulation.
Manage the simulation database: save or delete current run conditions, or retrieve previously saved run conditions.
Define the location of accessory programs and directories (used only during initial program setup or setup modification).
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

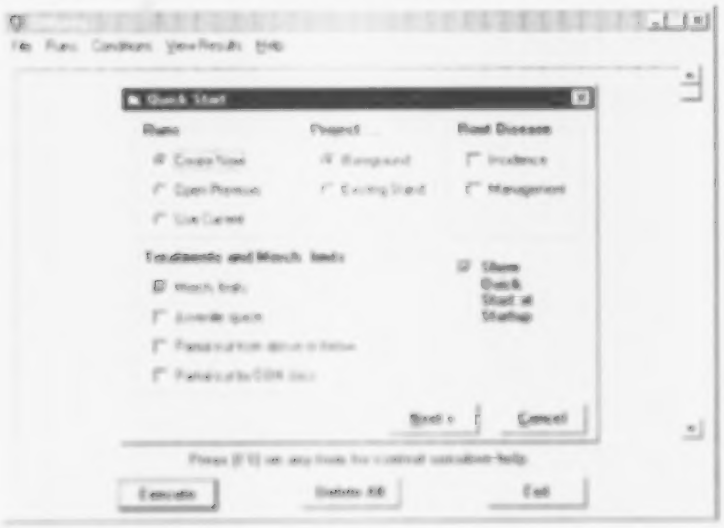
As users supply the information on which a simulation will be based, it is summarized on this form. An Edit button beside each information summary enables users to return to the source form to edit the entered data.

6.2 Quick Start

Quick Start provides a streamlined process for initiating a new run or modifying an existing one.

For a more detailed exploration of SIMprog and its capabilities, work through the tutorial lessons (Section 6.3).

SIMprog opens to a Prognosis™ identity or "splash" screen followed by the SIMprog main window screen overlaid by a Quick Start screen.



The Quick Start system offers SIMprog users an efficient means to initiate a new run or to modify an existing one. Quick Start prompts the user for information about the desired run, and develops a queue of forms to register the required information.

The following steps summarize how to build a simple base case run using Quick Start, and how to use the Menu system to add a treatment (in this case, partial cutting) to the run.

Step 1: Describe the intended run on the Quick Start form

Start SIMprog by double-clicking its icon. Click **OK** on the Welcome screen. If the **Quick Start** form is not already open, select **Quick Start** from the **Runs** menu. For this example, ensure that the **Create New** and **Existing Stand** radio buttons are selected, and that only the **Match Lists** check box is selected. Click **Next>**.

Step 2: Name and describe the run

Complete the **Duration and labels** form by naming the run and describing its features (e.g., bareground) in the appropriate dialog boxes. Overwrite or accept the example values for the length of the projection and time step between initial and subsequent reporting periods (typically 10 years). Click Next>.

Step 3: Enter site information

The model uses biophysical data to quantify site productivity. Complete the **Site Information** form by accepting or overwriting the example plant association, physical site, and stand information. Note that the interface relates information provided on B.C. Forest Region and biogeoclimatic subzone and site series to US Habitat Type (the plant community classification used internally by the model). Click Next>.

Step 4: Specify the inventory design

The **Inventory Design** form contains information on how tree data were collected (i.e., fixed or variable radius plots), the number of plots describing the stand, and the inventory year. Fill in the appropriate information and click Next>.

Step 5: Select the treelist

A **Tree Data Formats** message will remind you to select your treelist. Click Next to go to the **Work** directory where the sample treelist is stored. Select and open the file **ICH_example.tre**.

Step 6: Define the merchantability limits

Review the species merchantability limits and change as appropriate. Click Finish. A Quick Start message will tell you to use the Edit buttons to review, edit, or delete a group of conditions or use the Execute button to perform the run. Click OK.

Step 7: Run the model

The Main menu window displays a summary of the specified run conditions.

Click Edit beside any of the listed conditions to re-visit the appropriate form to make changes.

Click Execute to run SIMprog.

In the Model Run Options window that appears, ensure that the **Execute Model Run** box is checked. Only check the **Import Projected Treelist** box if you are interested in species or diameter class breakdowns and want to use

VIEWprog. Importing the treelist for simulations can be time-consuming and use up hard disk space. The options to **Save Output as ASCII files** and to **Review Actual Keywords** are available for advanced users. For more information on these functions, conact the Growth & Yield Model Support Centre.

Click OK. A run summary table will appear in a black DOS window over SIMprog and/or an FVS icon will appear on your taskbar. When the run is finished, close the DOS window if it does not close automatically.

Following the first run in any session, a SIMprog **Run Completed** message window will direct you to the **ViewResults** menu. Click OK.

Step 8: View results

The **View Results** menu offers three options for viewing SIMprog output:

- **Stand Summaries** output can be viewed as a table or graph, and various stand attributes can be plotted against time or another variable such as top height. The stand-level report produces stand summaries of stand attributes (e.g., SPH, BA, QMD). It also reports on the pre-harvest stand and the harvested and post-harvest components of the stand.
- **By Species and/or DBH Class** will open VIEWprog and enable you to plot stand and stock tables by time step, and species composition over the projection period. Stand and stock tables report stand attributes (SPH and volume, respectively) by DH class.

  To have access to this type of output, the **Import Projected Treelist** Model Run Option must be selected when SIMprog executes (Step 7).
- The **US Style Output** option provides a highly detailed text file that documents how the simulation was processed, what keywords were used, and how various events were scheduled. It also provides a series of summary tables describing the simulation results. To have access to this type of output, the **Save Output as ASCII files** Model Run Option must be selected when SIMprog executes (Step 7).

Step 9: Create a new run

After completing your basic run (Steps 1–7), you may wish to undertake subsequent runs examining specific silvicultural treatments. To do this, you will need to edit the Run ID to create a new run.

Click Edit beside the Run ID you have listed in the SIMprog main menu form. Type over the **Run Identifier** with a new name. Edit the Run Description to include a partial cutting treatment. Click OK.

Step 10: Add a treatment

Under the **Conditions** menu, select **Treatments,** then **Partial Cutting,** then **from Above or Below**. Describe the thinning strategy (i.e., from above or below), the post-thin target stand ("residual") in terms of either density or basal area, and specify the decision criteria for timing of treatment.
Click [OK].

Run the model again (click [Execute]) and use the **Stand Summaries** option under the **View Results** menu to compare the results with the base case.

6.3 Tutorial Overview

The tutorial is intended for people new to SIMprog.

Users already familiar with SIMprog may wish to go to the QuickReview, Section 4.3 or use the Quick Start menus that appear when you open SIMprog (Section 6.2).

Lesson 1: A Simple Run with Tabular Output

How to set up and run a simple stand projection and view basic stand-level tabular output.

Lesson 2: Modify a Run and Plot a Chart

How to import and modify an existing set of run conditions and view stand-level graphical output.

Lesson 3: Commercial Thinning and Plotting Combination Charts

How to add a commercial thinning treatment to a previous run and plot the results of both runs on one chart to facilitate comparison.

Lesson 4: Partial Cutting

How to select portions of a stand for harvesting based on species and diameter class, and further options for viewing output by species.

Lesson 5: Partial Cutting with Regeneration

How to include regeneration in your treatment strategy.

Lesson 6: Using the Root Disease Extension

How to include root disease in an existing stand simulation.

Lesson 1: A Simple Run with Tabular Output

Lesson Objectives

This lesson explains how to set up and run a simple stand projection and how to view basic stand-level tabular output.

The ability to work with sample data from existing stands is one of Prognosis^{BC}'s most useful features. In this lesson you will use data from a permanent sample plot to represent an existing stand and project that stand 50 years into the future.

Overview of Steps

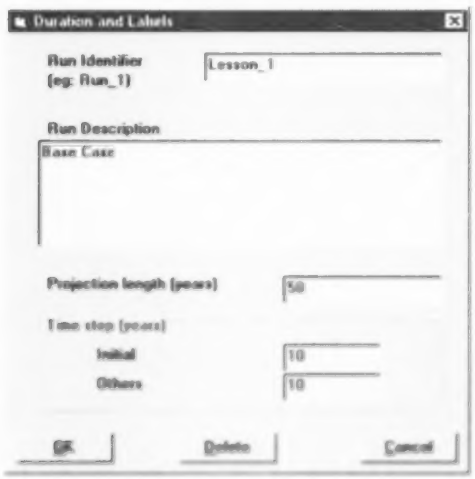
1. Start SIMprog.
2. Name and describe the run, and set the projection length and time step.
3. Describe the site.
4. Describe the inventory design.
5. Define the stand to be simulated.
6. Set the merchantable volume limits.
7. Run the model.
8. View the results in table form.

Step 1: Start SIMprog

1. Double click on the SIMprog icon in the ProgBC folder on your computer. If you have not yet installed the Prognosis^{BC} software, refer to Section 1.4, Installing Prognosis^{BC}.
2. On the Quick Start window, click Cancel.

Step 2: Name and describe the run, set the projection length and time step

1. Under the **Runs** menu, select **Create NEW**.
2. On the **Duration and labels** form, in the **Run Identifier** field, enter **Lesson_1**. This will be the name for the file containing the run conditions (if you save them) and all output. Note that names in this field must be a maximum of 8 characters with no spaces.
3. The optional **Run Description** field is useful in identifying key features of each run in a series. Describe the **Lesson_1** run as **Base Case**.
4. In the **Projection length (years)** field, enter the number of years that you wish to run the projection – for this lesson, accept the default **50** years.



5. In the **Time step (years)** frame, enter the interval on which SIMprog will perform calculations, assign treatments, and report statistics. For this lesson, use **10** years (the default) for both initial and subsequent time steps.

In the first year of a time step, the model:

- checks the condition of the stand
- applies the treatment if the specified parameter value for treatment has been met
- projects what remains in the stand for the coming decade.

A 10-year time step means that growth and mortality will be calculated and reported once every 10 years. Treatments will also be applied on a 10-year time step—specifically, in the first year of the 10-year time step after the specified parameter value (e.g., height, age) is exceeded. For example, if a partial cut is scheduled when the stand basal area exceeds 40 m^2/ha, the partial cut will be applied in the first year of the 10-year time step following when stand basal area exceeds 40 m^2/ha.

While a 10-year time step is recommended to avoid bias in the results (Prognosis^{BC} was calibrated based on a 10-year interval), it can create problems where timing of treatments is critical. For instance, under a 10-year time step, a treatment desired when a stand is 43 years old will not be implemented until the first year of the time step following the point at which the stand exceeds that parameter (i.e., age 50).

Using a smaller time step for the first interval can alleviate this problem without introducing undue bias. Setting an initial time step of 3 years would allow for treatments and reporting at years 0 and 3. Setting the "Others" time step at 10 years would mean that treatment and reporting occurred at years 13, 23, 33, 43, etc. In this way, the simulation would treat and report on the stand at the desired age (43).

6. Click OK.

When you exit this form, a SIMprog Help message will caution that projection lengths over 50 years are inadvisable for uneven-aged stands.

Step 3: Describe the site

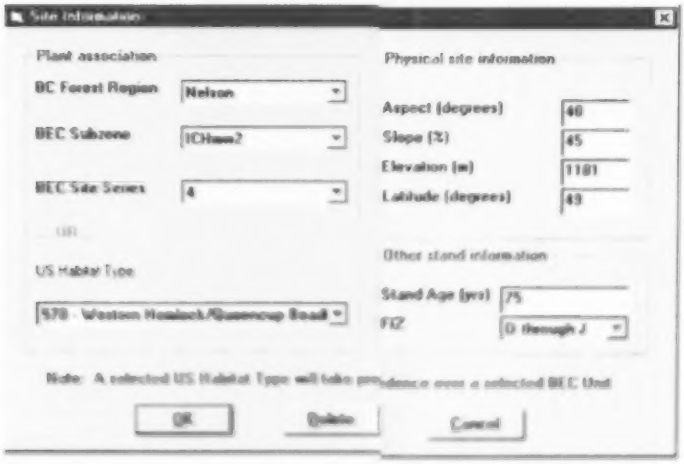
1. Under the **Conditions** menu, select **Site Information**.

   Prognosis^{BC} is designed for multi-species stands with complex structures. Site index cannot be used as a measure of productivity in such stands since its key assumptions (e.g., single species, even-aged, unsuppressed growth) are not valid. Therefore, the model uses ecosystem parameters to represent site productivity.

   Plant association is the main parameter driving site productivity. Since many of the core functions of Prognosis^{BC} are based on U.S. habitat types, a correlation table has been built into the model so that the biogeoclimatic ecosystem classification system can also be used. This limitation will be removed when all the underlying functions have been refit with B.C. data.

2. Complete the **Site Information** form as shown below, noting that:

Stand Age	Data in this field will not affect any calculations in the model, but is tracked and reported in some of the output.
FIZ	The D through J selection in this field is the appropriate selection for the southern interior of B.C. (the area for which PrognosisBC is currently calibrated). The model uses this information in calculating tree volumes.



3. Click OK.

Step 4: Describe the inventory design

SIMprog needs information on how tree data were collected, including information on the number and type of plots.

1. Under the **Conditions** menu, select **Projection based on...** ▸ **Existing Stand** ▸ **Inventory Design**. The **Inventory Design** form will appear.

   In the **Select plot types** frame, you will note a choice of **Fixed Area** or **Variable Radius**. Selecting both options in this frame indicates a variable radius (prism) plot with a fixed area subplot (e.g., for sampling small trees).

   All plots in the sample must have the same configuration.

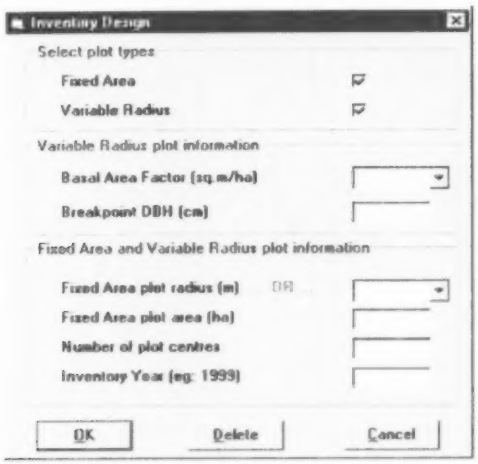
   Where **Variable Radius** plots have been used, the **Variable radius plot information** frame asks for the basal area factor for the plots, along with the breakpoint diameter. The breakpoint diameter is the smallest tree allowed to be measured in the variable radius plot.

   Where **Fixed Area** plots have been used (either for the main plot or for subplots), you will be asked in the **Fixed Area and Variable Radius plot information** frame for *either* the **Fixed Area plot radius (m)** or the **Fixed Area plot area (ha)**, as well as the **Number of plot centres**, and the **Inventory Year**. In fixed-area vegetation subplots, the breakpoint diameter is the highest diameter allowed to be measured in the subplots. The model assumes no growth in the inventory year (i.e., late summer or autumn measurements).

   Where both **Fixed Area** and **Variable Radius** plots are used, the following assumptions apply:

   - that large trees were sampled with the variable-radius plot and that small trees were sampled in the fixed-area plot
   - that there must be a small tree fixed-area plot for each large tree variable-radius plot
   - that the fixed-area plot and variable-radius plot must have the same plot number.

   Where **Variable Radius** plots with **Fixed Area** subplots have been used, you will be asked for information about both types of plots (as shown in the following screenshot).



2. For this lesson, enter the following information on the **Inventory Design** form, and click OK.

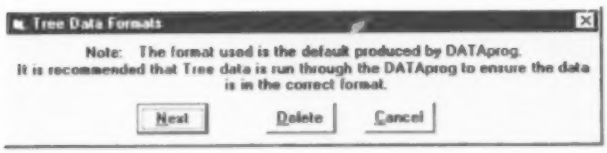
Step 5: Define the stand to be simulated

DATAprog is used to prepare the treelist file used by SIMprog.

The treelist file (created in DATAprog) contains tree measurements from sample plots in the stands to be projected. The plots may be fixed area or variable radius, and variable radius plots may have fixed-area subplots for small trees. All plots for a given stand must have the same area or basal area factor (BAF), and if any plots have subplots for small trees they must all have subplots.

The treelist is a DOS text file that must have the various tree attributes listed in columns and in a format that is recognizable by SIMprog. DATAprog is designed to take existing plot data (such as timber cruise data) and format it correctly for SIMprog.

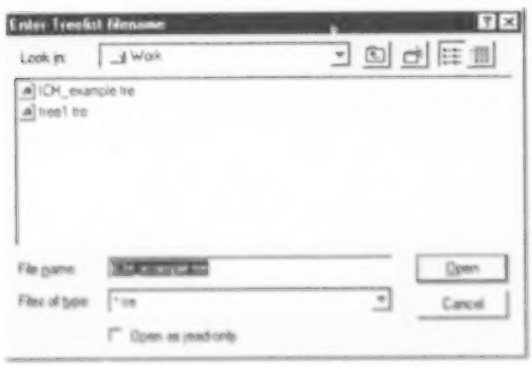
1. From the **Conditions** menu, select **Projection based on...** ▸ **Existing Stand** ▸ **Tree data**. The following reminder window will appear:


Tree Data Formats
Note: The format used is the default produced by DATAprog.
It is recommended that Tree data is run through the DATAprog to ensure the data is in the correct format.
Next
Delete
Cancel

2. Click Next, and the **Enter Treelist filename** window will appear:

The default location for treelist files from DATAprog is **C:\ProgBC\Work**.

For this lesson, you will use the example treelist **ICH_example.tre** in the \ProgBC\Work\ directory.



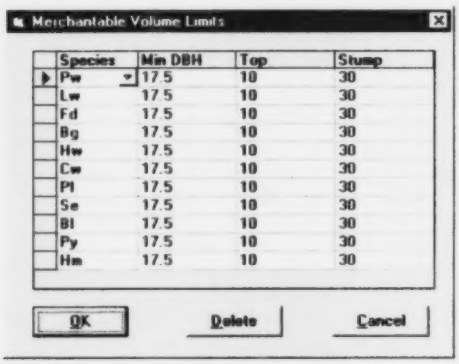
3. In this lesson, you will use the example treelist file **ICH_example.tre**. Click to select the file and then click Open.

   Click OK.

Step 6: Set the merchantable volume limits

1. In the SIMprog main window, under **Conditions** select **Merch. Vol. limits**.

   The **Merchantable Volume Limits** form allows you to modify the utilization standards for each species being simulated. All species currently supported by the model are listed. If you are unsure of appropriate values, consult Ministry of Forests district timber or inventory staff.

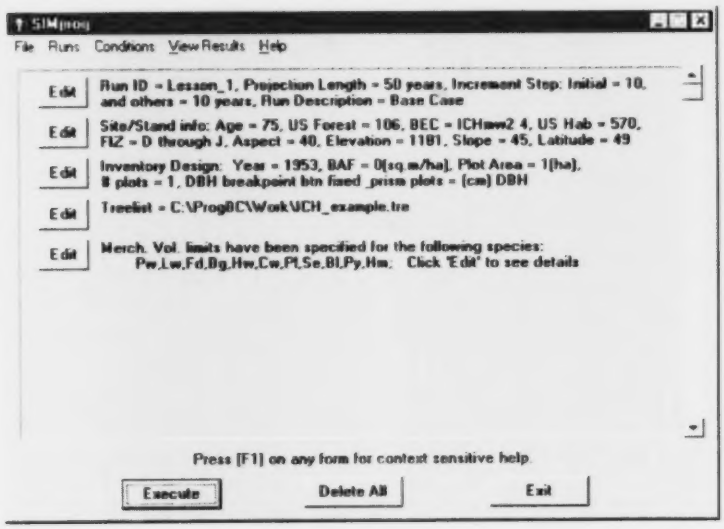


2. For this lesson, change the **Min DBH** values for **Hw** and **Cw** to **12.5** cm. Leave all other values at the default settings.

3. Click OK.

Step 7: Run the model

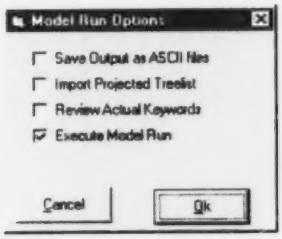
A summary of the run conditions that you have specified should now appear in the SIMprog main window. You can either select Edit beside any summary to revisit a particular form, or select Execute to run the simulation.


SIMprog
File Runs Conditions View Results Help
Edit
Run ID = Lesson_1, Projection Length = 50 years, Increment Step: Initial = 10, and others = 10 years, Run Description = Base Case
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570, FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
Edit
Inventory Design: Year = 1953, BAF = 0(sq.m/ha), Plot Area = 1(ha), # plots = 1, DBH breakpoint btn fixed _prism plots = (cm) DBH
Edit
Treelist = C:\ProgBC\Work\ICH_example.tre
Edit
Merch. Vol. limits have been specified for the following species:
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm; Click 'Edit' to see details
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

1. For this lesson, assume that on further reflection you contacted a regional inventory specialist, and found that you had made an incorrect assumption about merchantable volume limits.

   Click Edit beside the Merch. Vol. limits summary, and on the **Merchantable Volume Limits** form, change the **Min DBH** to **17.5** for all species.

2. Click OK to return to the SIMprog main window and click Execute. The **Model Run Options** form will appear:



These options affect model execution and output.

Option	Output	Purpose
Save Output as ASCII files	Two sets of output:	
	• one contained in the SIMprog database	Used in all SIMprog and VIEWprog results viewing routines
	• text-based detailed output file that includes error messages generated by the model	To use summary table information in spreadsheets and reports
		To view using the **US Style Output Option** under the **View Results** menu
Import Projected Treelist Importing the projected treelist into the database can be time consuming.	Individual tree data for each projection period in the database	Used in VIEWprog to produce stand and stock tables
		Do not select this option when exploring gross stand-level differences in treatment impacts of alternative silviculture scenarios (i.e., repeated simulations on the same stand)
		Select this option to explore specific diameter-class-level impacts
Review Actual Keywords	The DOS text file containing all the keywords constructed by SIMprog to control Prognosis^{BC}	Particularly useful for advanced users to check on keywords they have added using the Supplemental Keywords option
		Gets displayed in the "Current Run Keywords" screen
Execute Model Run		Begins simulation
Overwrite Existing Run	Available when the specified Run Identifier has been used before	When this option shows, continuing with the run will overwrite output from any previous run with the same name
		Uncheck this option to produce a reminder to enter a new Run Identifier

3. For this lesson, select only **Execute Model Run**.
4. Click OK.

As the model runs, a black DOS window will appear overtop of SIMprog and/or an FVS icon will appear in your taskbar. Click the DOS window (if visible) or the FVS icon to display the DOS command lines that initiate

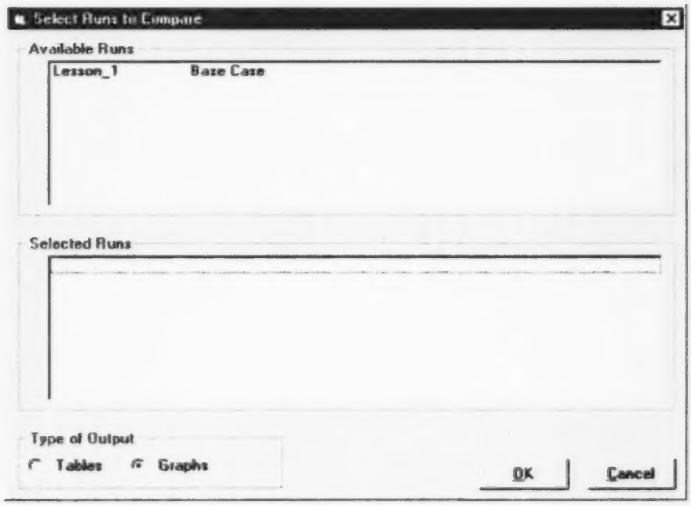
Prognosis^{BC} and several lines of text forming a summary table of the stand conditions at each simulation period. Don't worry if you can't read the entire table on your screen—alternatives for customizing, viewing, and printing this table are discussed in Step 8 and Lesson 3.

5. When the model has finished running, close the DOS window if it does not close automatically. Return to the SIMprog interface. A SIMprog **Run Completed** message window will direct you to the **View Results** menu.

   Click OK.

Step 8: View the results in table form

1. Under the **View Results** menu, select **Stand Summaries**. The **Select Runs to Compare** form will appear:



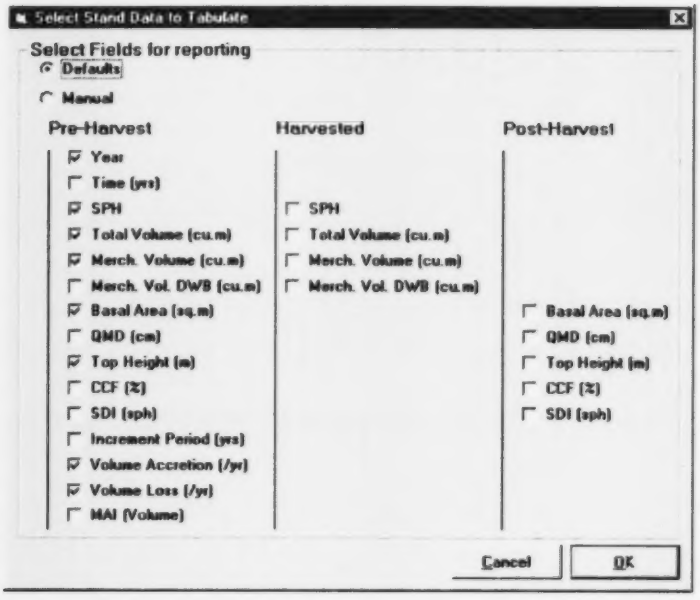
   The **Available Runs** field lists all the runs stored in the database for which summary information is available. The **Selected Runs** field lists the runs that you select to view (more than one can be chosen).

2. Click on **Lesson_1** in the **Available Runs** field to add it to the **Selected Runs** field. Note that if you click it again, you can move it back to **Available Runs**.

3. Select **Tables** in the **Type of Output** frame. Click OK.

   The **Select Stand Data to Tabulate** form that appears lists all stand-level statistics for which Prognosis^{BC} calculates values. Any item from the available list can be included in the summary table.

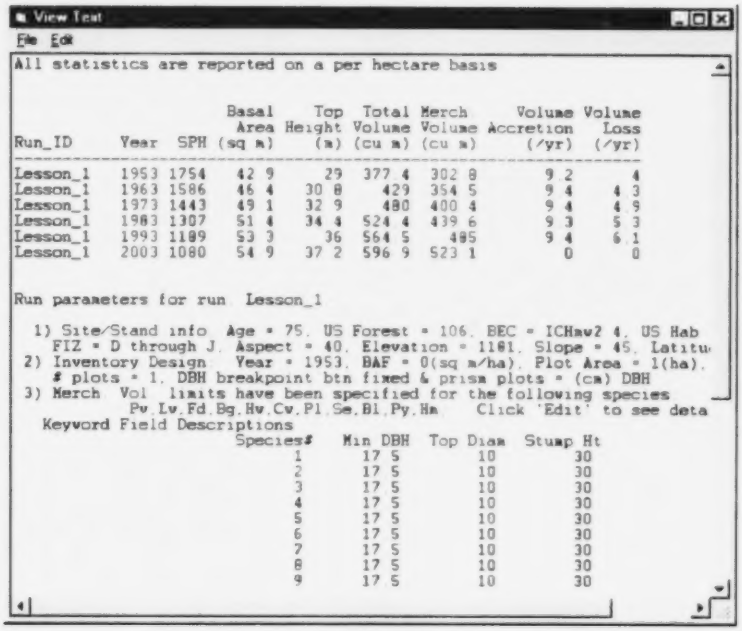
4. Accept the **Defaults** under **Select Fields for reporting**.



5. Click OK.

The summary table appears in the window of an auxiliary text-editing program (see following example), which can be saved or printed. If you had selected more than one run, the tables would appear one after the other along with their respective list of run conditions.

Note that the table displays the fields specified in the **Select Stand Data to Tabulate** form, followed by the list of run conditions. The table can be scrolled down.


View Text

File Edit

All statistics are reported on a per hectare basis

Run_ID	Year	SPH	Basal Area (sq m)	Top Height (m)	Total Volume (cu m)	Merch Volume (cu m)	Volume Accretion (/yr)	Volume Loss (/yr)
Lesson_1	1953	1754	42 9	29	377 4	302 8	9 2	4
Lesson_1	1963	1586	46 4	30 8	429	354 5	9 4	4 3
Lesson_1	1973	1443	49 1	32 9	480	400 4	9 4	4 9
Lesson_1	1983	1307	51 4	34 4	524 4	439 6	9 3	5 3
Lesson_1	1993	1189	53 3	36	564 5	485	9 4	6 1
Lesson_1	2003	1080	54 9	37 2	596 9	523 1	0	0

Run parameters for run Lesson_1

1) Site/Stand info Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitu
2) Inventory Design Year = 1953, BAF = 0(sq m/ha), Plot Area = 1(ha), # plots = 1, DBH breakpoint btn fixed & prism plots = (cm) DBH
3) Merch Vol limits have been specified for the following species
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm Click 'Edit' to see deta

Keyword Field Descriptions

Species#	Min DBH	Top Diam	Stump Ht
1	17 5	10	30
2	17 5	10	30
3	17 5	10	30
4	17 5	10	30
5	17 5	10	30
6	17 5	10	30
7	17 5	10	30
8	17 5	10	30
9	17 5	10	30

6. To return to SIMprog, select **Exit** from the **File** menu, and on the **Select Runs to Compare** form click Cancel.

   To quit SIMprog, click Exit.

   To continue with Lesson 2, click Delete All. SIMprog will ask if you wish to delete all assumptions; click Yes.

Lesson 2: Modify a Run and Plot a Chart

Lesson Objectives

This lesson shows how to import and modify an existing set of run conditions, and how to view stand-level graphical output.

Overview of Steps

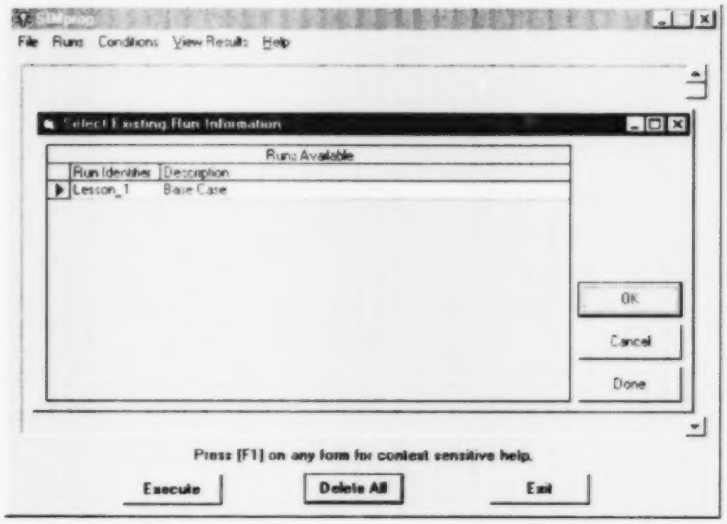
1. Import existing run conditions.
2. Reset the name and description for the new run.
3. Edit the merchantable volume limits.
4. Run the model.
5. View the results in graph form.

Step 1: Import existing run conditions

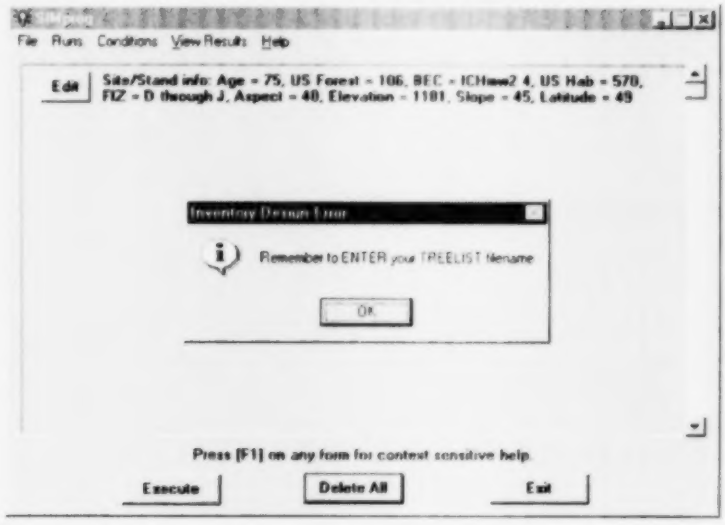
1. Start with a blank form in the SIMprog main window (i.e. if there are any condition summaries listed in the main window, click on Delete All to remove them.)

2. Under the **Runs** menu, select **OPEN Existing**. The **Select Existing Run Information** window will appear.

   Click on the row header next to **Lesson_1** to select the run, then click OK.

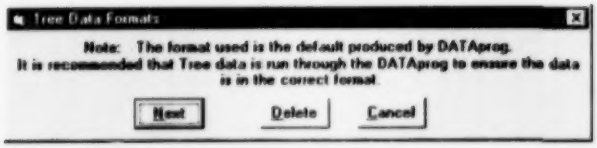


This will call up the summary of run conditions for Lesson 1, with a reminder to enter the treelist file name:


File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570,
FIZ = D through J, Aspect = 40, Elevation = 1101, Slope = 45, Latitude = 49
Inventory Design Error
Remember to ENTER your TREELIST filename
OK
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

3. Click OK, then under the **Conditions** menu select **Tree data**, as shown below.

This will bring up the following message:


Tree Data Formats
Note: The format used is the default produced by DATAprog.
It is recommended that Tree data is run through the DATAprog to ensure the data is in the correct format.
Next
Delete
Cancel

4. Click Next, which will take you to the **Work** directory where the sample treelist is stored. Select and open the file **ICH_example.tre**.

   This will complete the summary of run conditions for Lesson 1.

SIMprog
File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570, FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
Edit
Inventory Design: Year = 1953, BAF = 0[sq.m/ha], Plot Area = 1[ha], # plots = 1, DBH breakpoint btn fixed_prism plots = [cm] DBH
Edit
Merch. Vol. limits have been specified for the following species:
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm; Click 'Edit' to see details
Edit
Run ID = Lesson_1, Projection Length = 50 years, Increment Step: Initial = 10, and others = 10 years, Run Description = Base Case
Edit
Treelist = C:\ProgBC\Work\ICH_example.tre
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

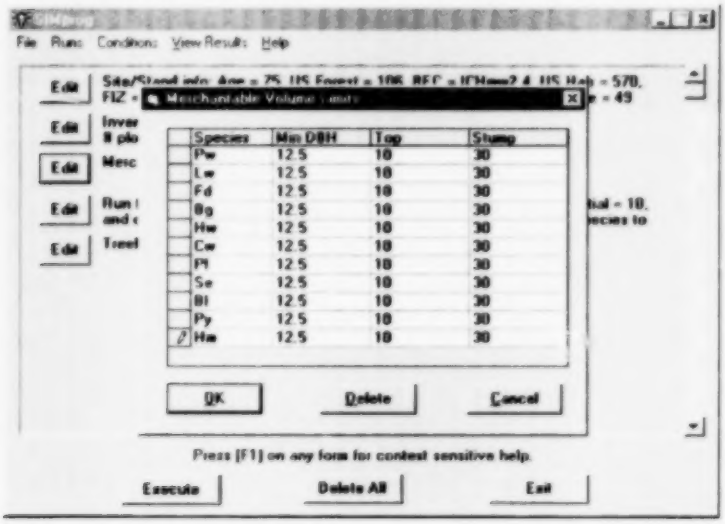
Step 2: Reset the name and description for the new run

1. Click Edit beside the **Run ID** summary.
2. On the **Duration and labels** form, change the name of the run to **Lesson_2**, change the description to **Set the merch. limit for all species to 12.5+**, and leave the other values as for Lesson 1.

3. Click OK.

Step 3: Edit the merchantable volume limits

1. Click [Edit] beside the **Merch. Vol.** summary, and in the **Merchantable Volume Limits** form, change the **Min DBH** for all species to **12.5**.
2. Click [OK].

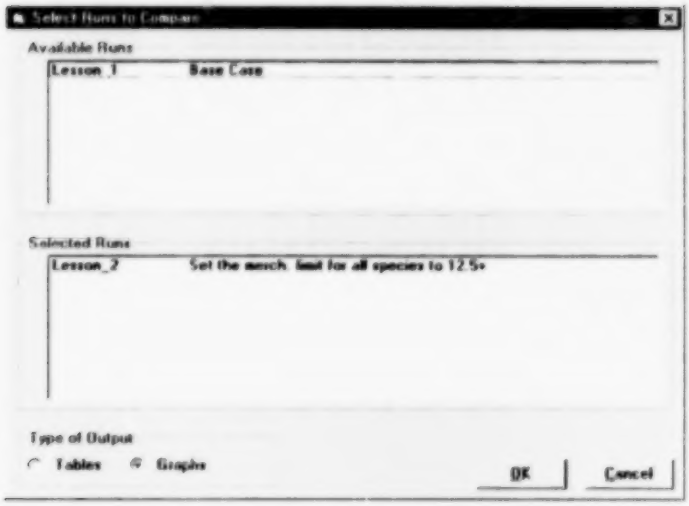


Step 4: Run the model

1. Click [Execute]. The **Model Run Options** form will appear with **Execute Model Run** selected.
2. Click [OK].
3. Follow the process outlined in Lesson 1, Step 7(5) regarding closing the DOS window and return to the SIMprog interface. A message will direct you to the **View Results** menu.

Step 5: View the results in graph form

1. Under the **View Results** menu, select **Stand Summaries**, and in the **Select Runs to Compare** form, under **Available Runs**, select **Lesson_2** (by clicking on it).
2. In **Type of Output** frame, select **Graphs**.
3. Click [OK].

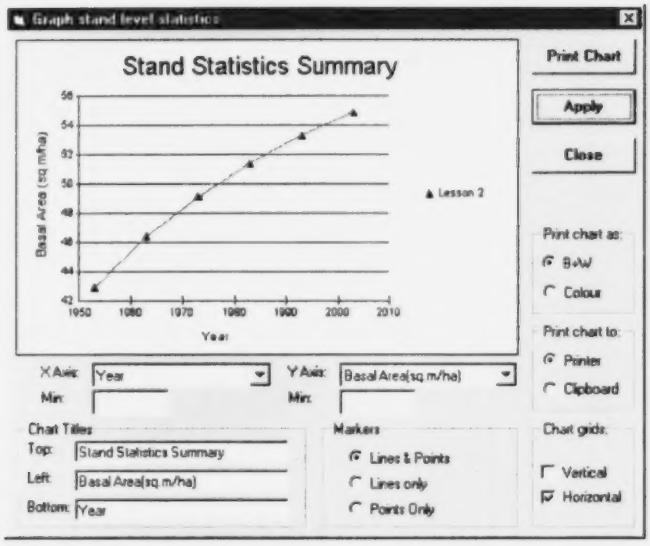


4. The **Graph stand level statistics** form allows you to specify the content and appearance of your graphs.

   Experiment with the options on this form:

   - change the title of the graph in the **Chart Titles** frame
   - try lines or points only in the **Markers** frame
   - add horizontal or vertical grid lines in the **Chart grids** frame
   - In the **Y Axis** field, click the list arrow to display the drop-down menu, and choose a different variable to plot. (Only rarely will variables other than **Year** or **Time (yrs.)** be appropriate on the *x*-axis.)
   - adjust the range displayed on each axis by changing value in the **Min.** field below each axis. (E.g., entering the value 1980 in the **X Axis Min.** field will truncate the left-hand side of the chart so that only the years 1980 to 2005 are displayed).

   Changes in the top chart title, markers, and chart grids will be implemented on the graph as you make them. Changes to the left and bottom chart titles and axes will not take place until you click Apply.



There are several options for printing or pasting this chart into a document in another application:

5. To print the chart:
   - in the **Print chart as** frame select **B+W** or **Colour**
   - in the **Print chart to** frame select **Printer**
   - click Print Chart in the top right corner of the form.

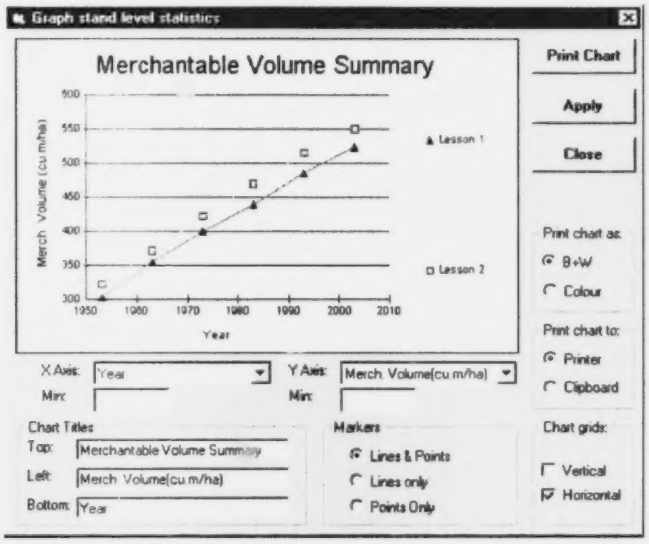
If you are pasting your file into MS Word use the **Paste Special** option under the **Edit** menu and paste it as a **Picture.**

6. To copy the chart:
   - in the **Print chart** to frame select **Clipboard**
   - click Print Chart
   - open the application (e.g., Microsoft Word) into which you want to paste the chart
   - choose **Paste Special** from the **Edit** menu, and paste it as a **Picture**.

You can build several different charts before leaving this form, but each must be printed or pasted into another application before the next is created.

7. It is possible to chart more than one run. In the **Select Runs to Compare** form, select both **Lesson_1** and **Lesson_2** from the **Available Runs** frame. Click OK.

8. When the merchantable volume is plotted for both lessons, it is easy to see the greater volume made available by the lower minimum DBH projected in Lesson 2.



9. When you are finished constructing charts, click Close in the **Graph stand level statistics** form, and click Cancel in the **Select Runs to Compare** form behind it.

Lesson 3: Commercial Thinning and Plotting Combination Charts

Lesson Objectives

In this lesson you will add a commercial thinning treatment to the previous scenario, and plot the results of both Lessons 2 and 3 on one chart for comparison.

Overview of Steps

1. Import existing run conditions.
2. Reset the name and description for the new run.
3. Add a commercial thinning treatment.
4. Run the model and use the DOS screen to evaluate the results.
5. Produce a chart and table comparing thinned and unthinned stands.
6. View output by species and diameter class.

Step 1: Import existing run conditions

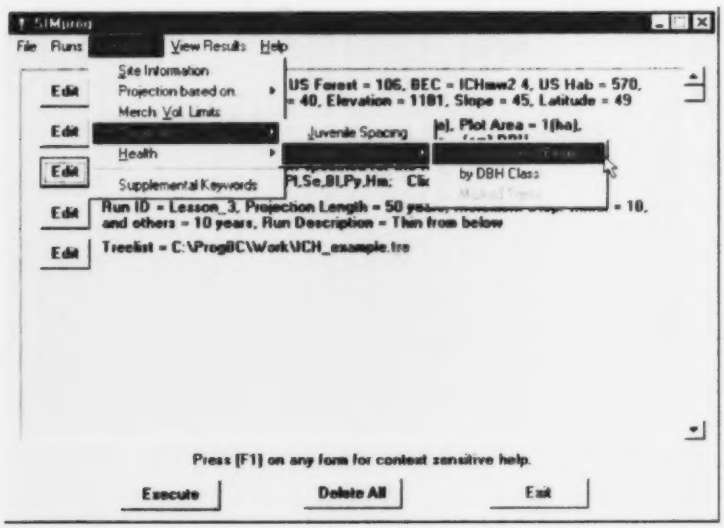
1. If the run conditions from Lesson 2 are still listed in the SIMprog main window, you can start directly from those.
2. Otherwise, click [Delete All] to clear the form, under the **Runs** menu select **OPEN Existing**, and under **Select Existing Run Information**, select **Lesson_2 Set the merch. limit for all species to 12.5+**.
3. Click [OK].

Step 2: Reset the name and description for the new run

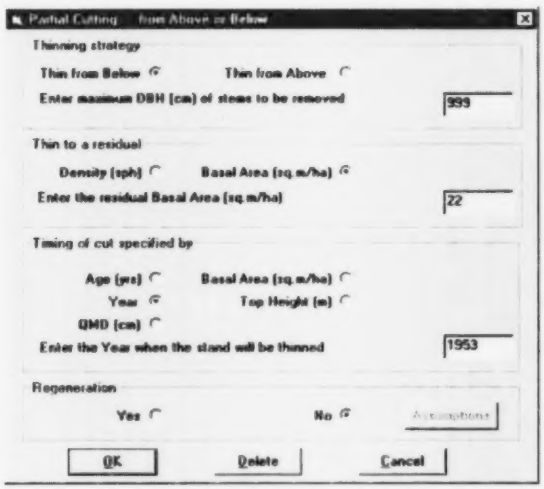
1. Click [Edit] beside the **Run ID** summary.
2. On the **Duration and labels** form, change the **Run Identifier** to **Lesson_3** and the **Run Description** to **Thin from below**.
3. Click [OK].

Step 3: Add a commercial thinning treatment

1. Under the **Conditions** menu, select **Treatments ▸ Partial Cutting ▸ from Above or Below**.



2. Fill out the **Partial Cutting...from Above or Below** form as shown on the following screenshot.



Note that as you change the radio buttons, the information requested in the accompanying text field also changes.

Thinning Strategy	Thin from Below	Enter maximum DBH (cm) of stems to be removed
	Thin from Above	Enter minimum DBH (cm) of stems to be removed
Thin to a residual	Density (SPH)	Enter the Residual Density (SPH)
	Basal Area (sq. m/ha)	Enter the Residual Basal Area (sq. m/ha)
Timing of cut specified by	Age	Enter the stand age (years) when thinned
	Year	Enter the year when the stand will be thinned
	QMD (cm)	Enter the QMD (cm) prior to thinning
	Basal Area (sq. m/ha)	Enter the basal area (sq. m/ha) prior to thinning
	Top Height	Enter the top height (m) prior to thinning

In the **Thinning strategy** frame at the top of the form, you are asked to enter a maximum or minimum DBH of stems to be removed. These parameters are useful if you already know the shape of your diameter distribution and wish to thin by truncating that distribution to a specific diameter limit. Any value entered in this field, other than the default

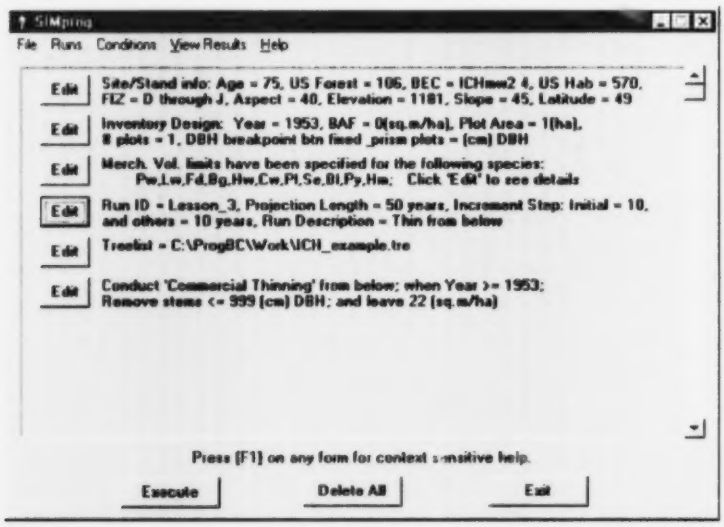
values, may override specified residual density or basal area values. *Under most circumstances, it is not advisable to alter the default values in this field.*

In the **Timing of cut specified by** frame, you are asked to identify the parameter on which cutting will be based, along with the condition that must be met. The treatment will be applied at the beginning of the first time step where the stand condition (or year) meets or exceeds the stated parameter value. For example, if you had specified thinning based on a minimum top height of 30 m, and the simulation predicts top heights of 29 m in 1953 and 30.8 m in 1963, the stand will be thinned in 1963—the beginning of the first time step where the stand meets or exceeds a top height of 30 m.

3. Click OK.

4. As you exit this form, you will be warned that you have not entered any post-treatment regeneration assumptions. Since you are not concerned about regeneration after a thinning treatment (as you would be if you used this same form to simulate a shelterwood cutting), ignore the warning and click Yes to continue.

The summary of run conditions in the SIMprog main window will look like this:


SIMprog
File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570, FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
Edit
Inventory Design: Year = 1953, BAF = 0(sq.m/ha), Plot Area = 1(ha), # plots = 1, DBH breakpoint btn fixed _prism plots = (cm) DBH
Edit
Merch. Vol. limits have been specified for the following species: Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hw; Click 'Edit' to see details
Edit
Run ID = Lesson_3, Projection Length = 50 years, Increment Step: Initial = 10, and others = 10 years, Run Description = Thin from below
Edit
Treelist = C:\ProgBC\Work\ICH_example.tre
Edit
Conduct 'Commercial Thinning' from below; when Year >= 1953; Remove stems <= 999 (cm) DBH; and leave 22 (sq.m/ha)
Press (F1) on any form for context sensitive help.
Execute
Delete All
Exit

Step 4: Run the model and use the DOS screen to evaluate the results

Note: If you are running Windows NT, the program will execute and the DOS window will close automatically. You will need to go to **Stand Summaries** under the **View Results** menu to retrieve this tabular information (see Step 5[5]).

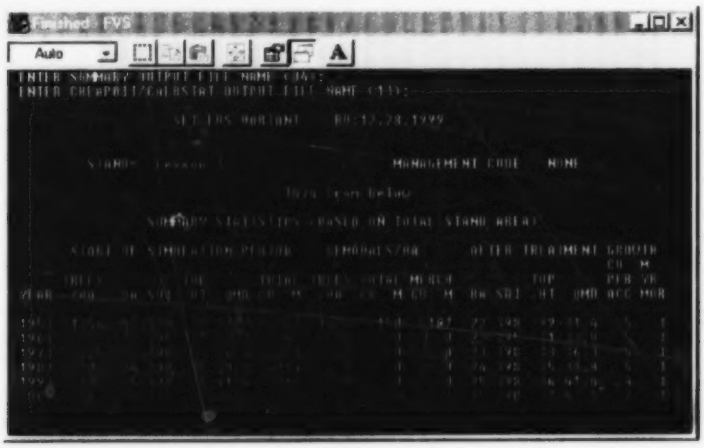
1. On the SIMprog main window click Execute, and on the **Model Run Options** form select **Execute Model Run**; if **Overwrite Existing Run** is showing, leave it checked).

2. Click OK.

   In the DOS screen stand summary statistics table, examine the development of descriptive parameters such as trees/ha (column 2), basal area (column 3), quadratic mean diameter (column 6) and total volume (column 7).

3. The trees/ha drops significantly after the thinning in 1953. The thinning leaves an after-treatment basal area of 22 m^2/ha as you had specified in the **Partial Cutting...from Above or Below** form. These results confirm that your treatment has been applied as expected.

   Note the difference between total thinning volume (column 9) and merchantable thinning volume (column 10) in the row for 1953 when the stand is commercially thinned. This difference also makes sense in light of the specified merchantable diameter limit (12.5 cm).



4. Close the DOS window to return to SIMprog.

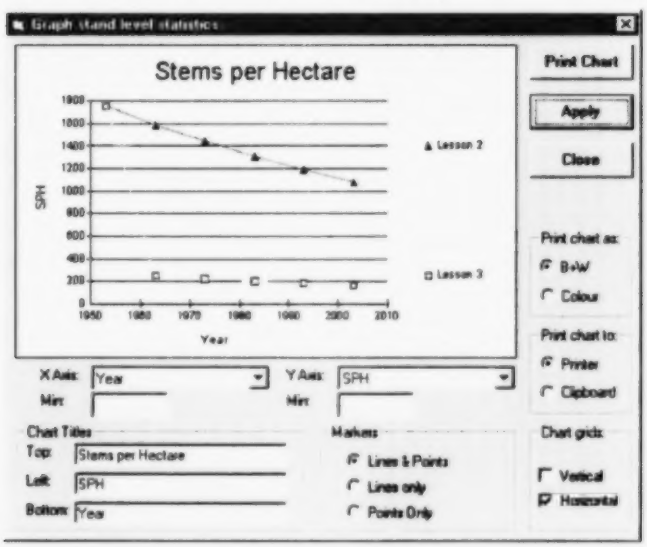
Step 5: Produce a chart and table comparing thinned and unthinned stands

Plotting the results of both Lessons 2 and 3 on one chart allows you to visually compare their differences.

1. Under the **View Results** menu, select **Stand Summaries**.
2. On the **Select Runs to Compare** form, in the **Available Runs** field, click both **Lesson_2** and **Lesson_3** to move them to the **Selected Runs** field.
3. In the **Type of Output** frame, select **Graphs**, then click OK.
4. On the **Graph stand level statistics** form, graph relevant parameters (e.g., stems per hectare, basal area, merchantable volume) to explore the differences between stands in Lessons 2 and 3.

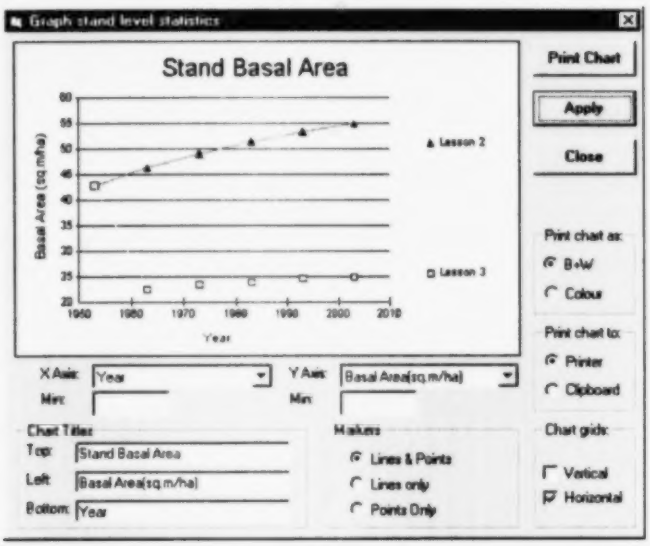
   Note in the following charts the difference in stand trajectories between the untreated stand (Lesson 2) and the stand thinned from below (Lesson 3). Both stands are identical in all other respects.

   On the Stems per Hectare chart, note that the slope of line in Lesson 2, which represents the mortality from self-thinning, is more steep than the slope of the line for Lesson 3. This is because thinning-from-below has increased the amount of growing space per residual tree, and there is very little subsequent self-thinning mortality.

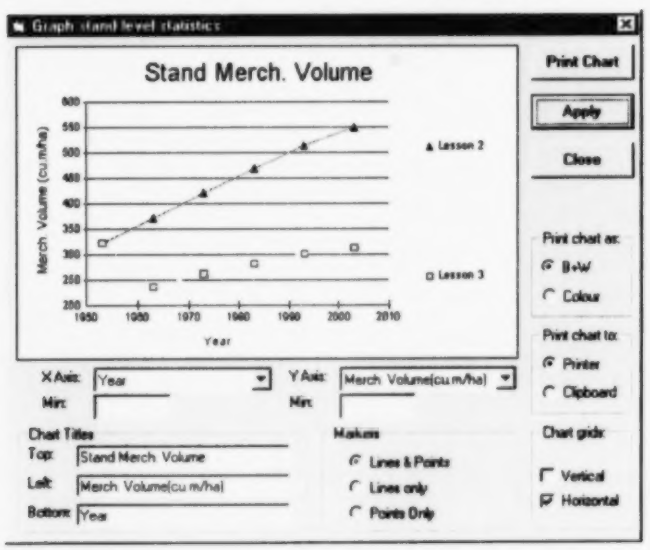


On the Stand Basal Area chart, the slope of the Lesson 2 line indicates that the stand is growing well despite losses due to self-thinning. By comparison, the residual stand (Lesson 3) is growing more slowly.

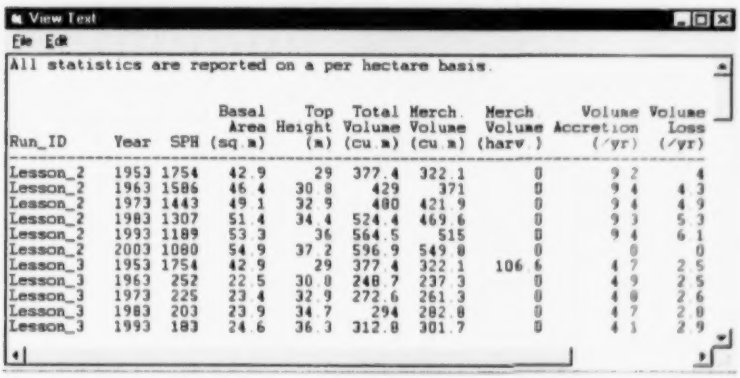
See Lesson 2, Step 5 to review how to change the content and appearance of charts.



Similar to the chart of Stand Basal Area, the Stand Merch. Volume chart shows the difference in the rate at which the two stands are growing. The basal area and merchantable volume lines of the residual and unthinned stand are still diverging 50 years after thinning. This suggests that the stand may have been thinned too heavily or that the residual trees have not responded to the increased growing space.



5. To evaluate these differences quantitatively, you can produce numerical output using the **Tables** option in the **Select Runs to Compare** form. On the **Select Stand Data to Tabulate** form, check the **Merch. Volume (cu.m)** under the **Harvested** column.


View Text

File Edit

All statistics are reported on a per hectare basis.

Run_ID	Year	SPH	Basal Area (sq.m)	Top Height (m)	Total Volume (cu.m)	Merch. Volume (cu.m)	Merch Volume (harv.)	Volume Accretion (/yr)	Volume Loss (/yr)
Lesson_2	1953	1754	42.9	29	377.4	322.1	0	9.2	4
Lesson_2	1963	1586	46.4	30.8	429	371	0	9.4	4.3
Lesson_2	1973	1443	49.1	32.9	480	421.9	0	9.4	4.9
Lesson_2	1983	1307	51.4	34.4	524.4	469.6	0	9.3	5.3
Lesson_2	1993	1189	53.3	36	564.5	515	0	9.4	6.1
Lesson_2	2003	1080	54.9	37.2	596.9	549.8	0	0	0
Lesson_3	1953	1754	42.9	29	377.4	322.1	106.6	4.7	2.5
Lesson_3	1963	252	22.5	30.8	248.7	237.3	0	4.9	2.5
Lesson_3	1973	225	23.4	32.9	272.6	261.3	0	4.8	2.6
Lesson_3	1983	203	23.9	34.7	294	282.8	0	4.7	2.8
Lesson_3	1993	183	24.6	36.3	312.8	301.7	0	4.1	2.9

The table provides more information on the two stands. The Volume Loss column shows that there is much less mortality after thinning, while the Volume Accretion column indicates that the unthinned stand accumulated volume at about twice the rate of the thinned stand. In 1953 some 106.6 m^3 were harvested (Lesson 3). By 2003, the thinned stand had some 236.5 m^3 more standing merchantable volume than the unthinned stand.

6. Click [Close] and then [Cancel] on the **Select Runs to Compare** form to return to the SIMprog main window.

Step 6: View output by species and diameter class

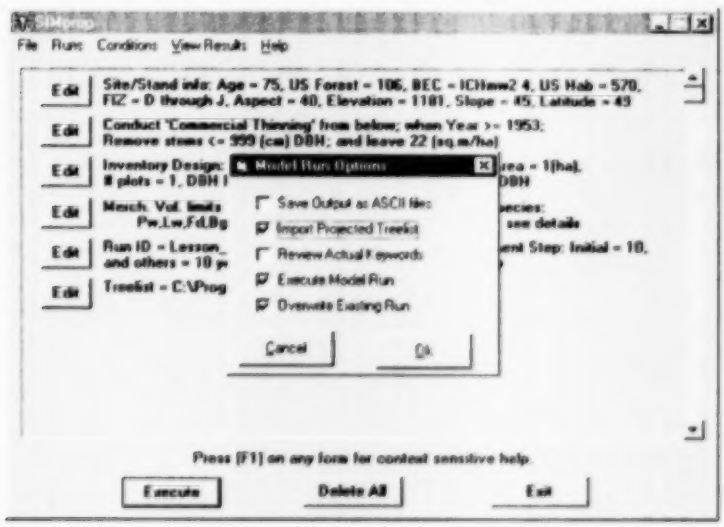
A more complete discussion of how to display output by species and diameter class is found in the VIEWprog tutorial (Section 7).

VIEWprog, the third software component in Prognosis^{BC} makes it possible to view simulation results as summaries of trees per hectare (stand) and merchantable volume (stock) by diameter class and species. VIEWprog can be run independently, or can be initiated from SIMprog's **View Results** menu. The following procedure provides only enough information to generate VIEWprog output specifically needed for this lesson.

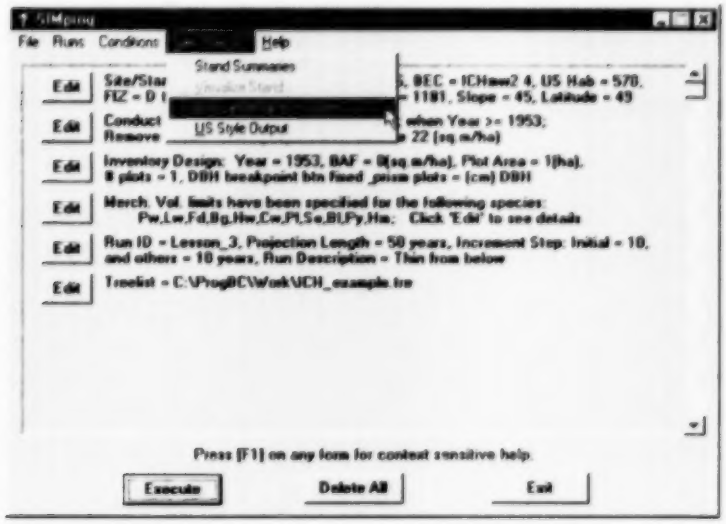
1. To use VIEWprog you will need to rerun Lesson 3 and import the treelist.

   Under the **Runs** menu, select **Lesson_3** and execute. On the **Model Run Options** form, you must select **Import Projected Treelist**, **Execute Model Run** (default), and **Overwrite Existing Runs** (default because you are re-executing Lesson 3).

Click OK. When the execution is complete, close the DOS window to return to the SIMprog main window.


File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHww2 4, US Hab = 570,
FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
Edit
Conduct 'Commercial Thinning' from below; when Year >= 1953;
Remove stems <= 999 (cm) DBH; and leave 22 (sq.m/ha)
Edit
Inventory Design:
plots = 1, DBH
Model Run Options
Edit
Merch. Vol. limits
Pw,Lw,Fd,Bg
Edit
Run ID = Lesson_
and others = 10 y
Edit
Treelist = C:\Prog
Save Output as ASCII file
Import Projected Treelist
Review Actual Keywords
Execute Model Run
Overwrite Existing Run
Cancel
Ok
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

2. Under the **View Results** menu, select **By Species and/or DBH Class**.


File Runs Conditions Help
Stand Summaries
US Style Output
Edit
Edit
Edit
Edit
Edit
Edit
Inventory Design: Year = 1953, BAF = 0[sq.m/ha], Plot Area = 1[ha],
plots = 1, DBH breakpoint btn fixed _prism plots = (cm) DBH
Merch. Vol. limits have been specified for the following species:
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Sx,Bl,Py,Hm; Click 'Edit' to see details
Run ID = Lesson_3, Projection Length = 50 years, Increment Step: Initial = 10,
and others = 10 years, Run Description = Thin from below
Treelist = C:\ProgBC\Work\ICH_example.tre
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

3. The VIEWprog splash screen will appear. Click OK.

4. On the **Stand Structure Reporting System** form, select **Lesson_3: Standing**. In the **Report Type** frame, select **Stand & Stock Tables** and **Species Composition**.

   Click OK.

   Two forms will appear:

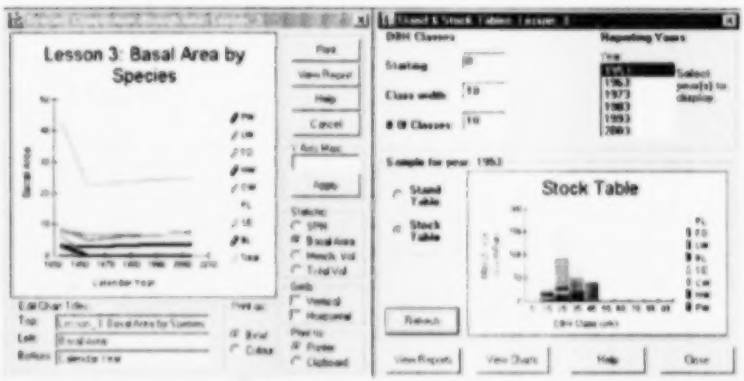
   - Species Composition through time <Run ID>
   - Stand & Stock Tables <Run ID>.

   The **Species Composition through time** form plots the SPH, basal area, merch. volume (net DWB), and total volume through time for the stand as a whole and for each species comprising the stand.

   The **Stand & Stock Tables** form displays graphical stand (density) and stock (merchantable volume) tables for any year or multiple years selected from the **Reporting Years** frame.

5. In the **Species Composition through time** form, in the **Statistic** frame, select **Basal Area**.

   Note that the PL and LW components of the stand do not respond to the thin-from-below treatment (i.e., these lines are flat), whereas the FD and PW components do respond after treatment (i.e., these lines slope upwards).

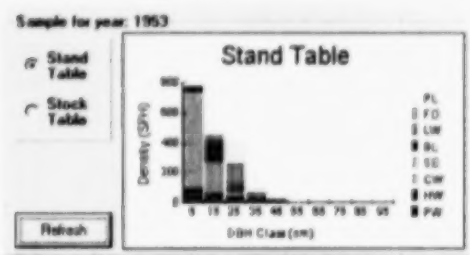


6. In the **Stand & Stock Tables** form, in the **Reporting Years** frame, select **1953**. In the **Sample for year frame**, select **Stock Table**.

   Click Refresh. (Prior to clicking Refresh the bar chart displayed is a "dummy.")

   Note that prior to thinning in 1953 the PL and LW components of the stand comprise the larger DBH classes.

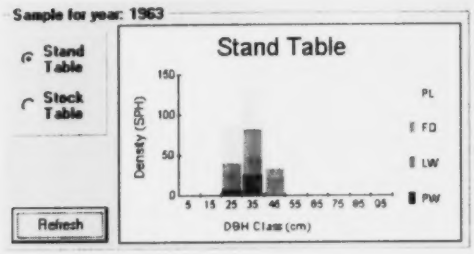
7. Next, select **Stand Table** in the **Sample for year** frame. Note that prior to thinning, CW, BL, and HW comprise the smaller DBH classes and FD comprises the mid-size classes.



8. In the **Reporting Years** frame, select the year **1963** (10 years after thinning from below) and click Refresh.

   The thinning treatment removed the CW, BL, and HW components of the stand. Like the FD component of the stand, we would expect these shade-tolerant species to respond to the thinning.

   Lesson 4 will test an alternative thinning strategy to remove the large PL and LW that have not responded to this thinning.



9. To return to the SIMprog main window, click Close, then under the **File** menu, choose **Exit**.

Lesson 4: Partial Cutting

Lesson Objectives

This lesson will show you how to select portions of a stand (PL, LW, PW) for harvesting based on species and diameter class, and introduce further options for viewing output by species.

Overview of Steps

1. Reset the name and description of the new run.
2. Define the harvest treatment.
3. Run the model and view output by species and diameter class.

Step 1: Reset the name and description for the new run

1. If the run conditions for Lesson 3 are still listed in the SIMprog main window, you can start directly from those.
2. Otherwise, click [Delete All] then recall the conditions from the database. (Under the **Runs** menu, select **OPEN Existing,** then on the **Select Existing Run Information** window form, select **Lesson_3** and click [OK]).
3. An **Inventory Design Error** message window will remind you to enter the treelist filename for this run. Click [OK].
4. On the SIMprog main window, under the **Conditions** menu, select **Projections based on... ▸ Existing Stand ▸ Tree data ▸ ICH_example.tre**
5. Click [Edit] beside the **Run ID** summary to open the **Duration and labels** form. Change the name of the run to **Lesson_4** and the description to **Partial cut**. Accept the default values for length of projection and time steps.
6. Click [Edit] beside the **Conduct Commercial Thinning** summary to open the **Partial Cutting...from Above or Below** form. Click [Delete].
7. All other conditions (site/stand information, inventory design, merchantable volume limits) remain the same as for Lesson 3.

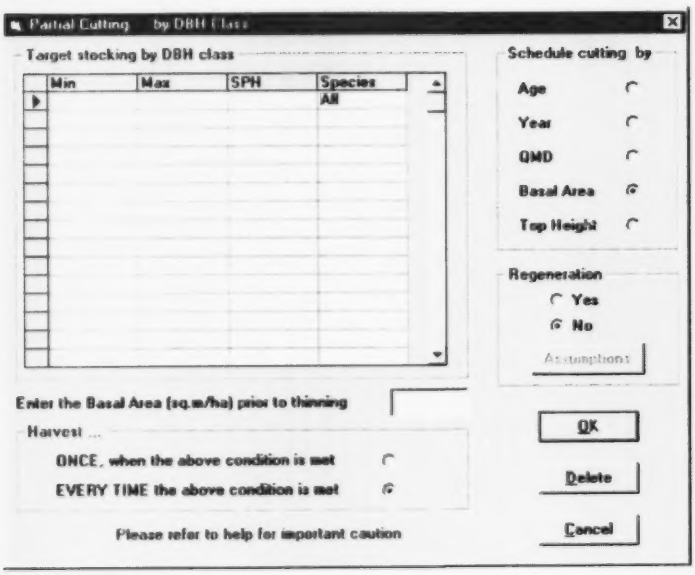
Step 2: Define the harvest treatment

The harvest treatment is based on the following assumptions:

- the large PL and LW are not capable of responding to increased growing space
- the PW will be removed due to blister rust concerns
- the intermediate and shade-tolerant species will be favoured for retention as they will likely respond to thinning.

1. Under the **Conditions** menu, select **Treatments** ▸ **Partial Cutting** ▸ **by DBH Class**.

   This will open the **Partial Cutting...by DBH Class** form, which is used to specify the portion of the stand to be harvested/thinned in terms of species, DBH, residual density, and timing of treatment. This form is often used to simulate cutting of uneven-aged forests, where a target diameter distribution is used to regulate cutting.

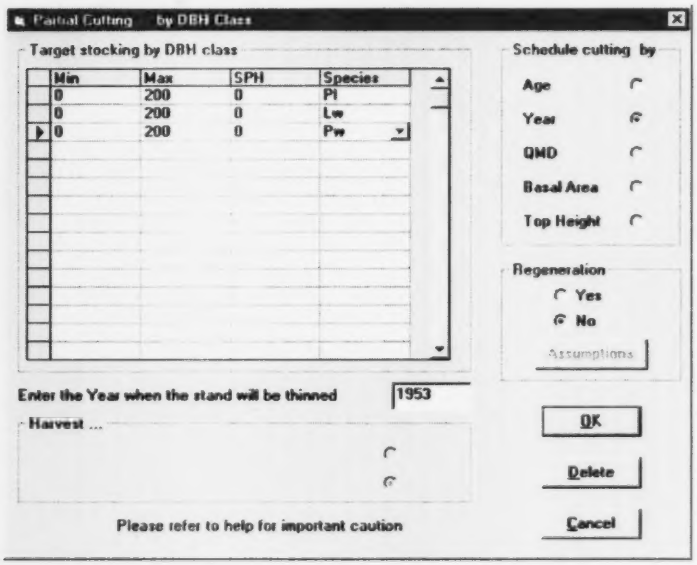


In the **Target Stocking by DBH class** frame, the species and DBH range are specified for any portion of the stand that is to be removed in part or in whole. One line in this table can represent a single species, or all species that are present. Diameter classes can be any width and have any end points. Where a particular diameter class is to be completely removed, specify a residual stems per hectare (SPH) value of zero. Any stand components that are not explicitly defined in this table will have no harvest/thinning removals.

In the **Schedule cutting by** frame there are several decision criteria for specifying when SIMprog will simulate a treatment. If age or year are specified, only a single treatment will occur. If one of the other criteria are specified, text will appear in the **Harvest** frame that will allow you to specify whether the treatment occurs **ONCE**, when the criterion is met, or **EVERY TIME** the criteria is met. The **EVERY TIME** option is used to simulate cyclical treatments such as harvest entries for uneven-aged management.

In the **Regeneration** frame, you specify whether the treatment will result in a significant regeneration event (either natural or planting). If you select **Yes**, you must click Assumptions to go to the **Partial Harvest Regen. Assumptions** form, where you specify the regenerated species by SPH or percentage.

2. For this lesson, enter data to match the following form.



Each line of the **Target Stocking by DBH class** table represents a portion of the defined harvest treatment. In this case, all three species are removed in one partial cut by setting minimum and maximum diameter values that will encompass all trees present and the residual SPH at zero so that no trees will remain after thinning.

Note the reference to help at the bottom of the screen. Since there is not a help button on this screen, you must access help by striking the F1 key on your keyboard. The caution note includes the following:

- Diameter classes must not overlap.

Only those portions of the stand described within the diameter classes specified will be thinned. If you miss a portion of the current stand in your diameter limit description, it will not be harvested. If you split the stand up by species and you miss a species, that species will not be thinned.

- If you wish to remove all stems in a particular class, you must specify the class and thin it to zero residual trees/ha.
- If there are fewer trees in a diameter class in the pre-harvest stand than specified for the residual stand, no harvest will occur in that class. This may result in a lower harvest level than expected.

  Trees are thinned in the order they appear in the inventory treelist file. If your treelist is anything other than totally random, this may have important implications. If your treelist is ordered by size, the largest or smallest trees in each size class will be the first harvested depending on whether the list is in ascending or descending order. A greater potential problem is if the treelist is ordered by species, and you use **All** in the species selection cell. In this case, the species that is first in the treelist will be ranked for thinning.

3. Click [OK]. This will trigger the message "You have not specified the Regeneration Assumptions. Do you wish to Continue? Click [Yes].

   The SIMprog main window should have the following conditions:

SIMprog
File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570, FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
Edit
Inventory Design: Year = 1953, BAF = 0(sq.m/ha), Plot Area = 1(ha), # plots = 1, DBH breakpoint btn fixed _prism plots = (cm) DBH
Edit
Merch. Vol. limits have been specified for the following species: Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm; Click 'Edit' to see details
Edit
Run ID = Lesson_4, Projection Length = 50 years, Increment Step: Initial = 10, and others = 10 years, Run Description = Partial cut
Edit
Treelist = C:\ProgBC\Work\ICH_example.tre
Edit
Conduct Partial Cutting: when Year >= 1953; (Edit this item to see DBH ranges, Species and SPH removed)
Press [F1] on any form for context sensitive help
Execute
Delete All
Exit

Step 3: Run the model and view output by species

1. Click [Execute], and in the **Model Run Options** form, select **Import Projected Treelist** and **Execute Model Run**. Click [OK].

2. After the model is finished executing, close the DOS window and return to the SIMprog interface.

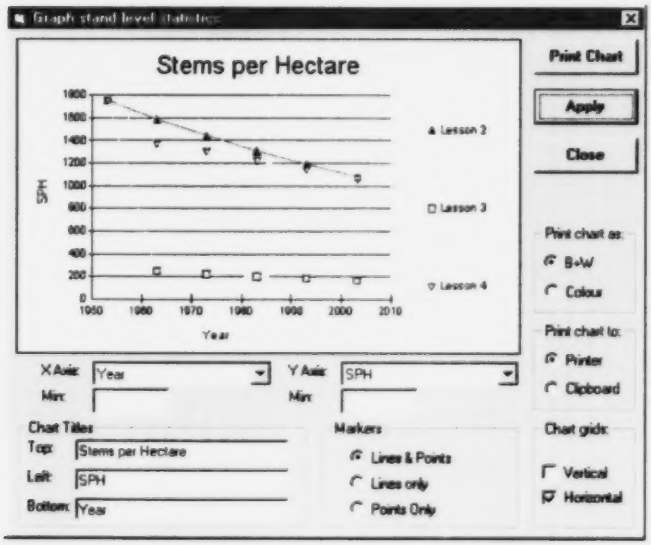
3. Under the **View Results** menu, select **Stand Summaries**, and in the **Select Runs to Compare** form, under **Available Runs**, select **Lesson_2, Lesson_3, Lesson_4**. In the **Type of Output** frame, select **Graphs**. Click [OK].

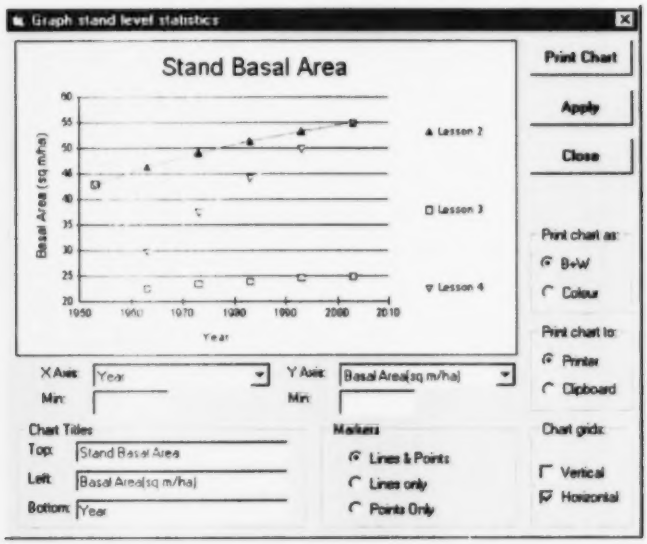
4. A review of stand statistics for these lessons reveals the following:

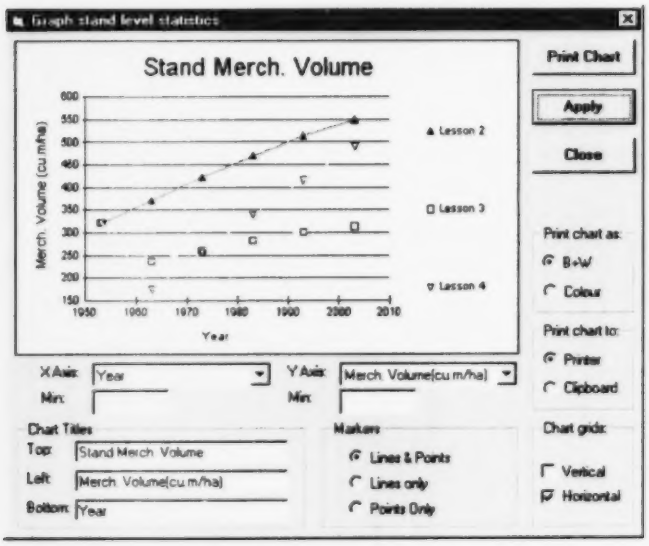
   - the **Stems per Hectare** graph shows that the Lesson 4 partial cut that removed the PL, LW, and PW components of the stand, was less severe than the commercial thinning carried out in Lesson 3

   - the **Stand Basal Area** graph shows a significant increase in stand growth following the partial cut in Lesson 4, due to the increased growing space for the residual stems

   - the **Stand Merch. Volume** graph shows that although the residual stands in Lesson 3 and 4 had the same basal area, the residual stand in Lesson 4 had less merchantable volume. This indicates that the stems removed in the partial cut were in the larger diameter classes.







5. To find out more of the dynamics associated with these stand-level statistics, click Close on the **Graph stand level statistics** form to return to the SIMprog main window.

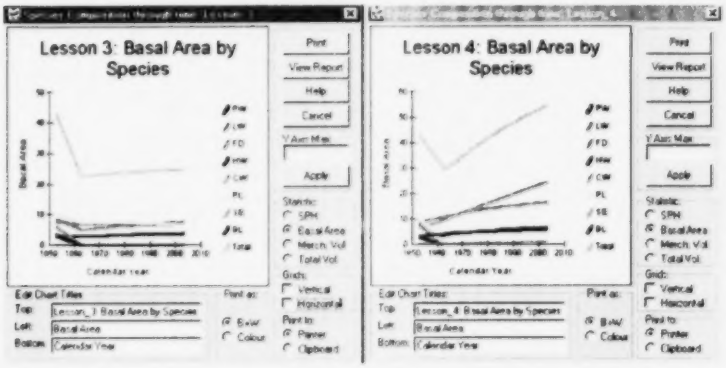
   Under the **View Results** menu, select **By Species and/or DBH Class**. This will launch VIEWprog. Click OK when the splash screen appears.

6. In the **Available Runs** frame on the **Stand Structure Reporting System** form, select **Lesson_3: Standing** and **Lesson_4: Standing**.

   In the **Report Type** frame, select **Species Composition**. Click [OK].

7. In both **Species Composition through time** forms, in the **Statistic** frame, select **Basal Area**.

   In Lesson 3, the PL and LW components of the stand did not respond to the increase in growing space. In Lesson 4, the tolerant species (e.g., FD, CW, HW, BL) responded to the increase in growing space as expected.



8. To return to the SIMprog main window click [Cancel] to return to the stand **Structure Reporting System** form, then select **Exit** under the **File** menu.

For a more complete introduction to VIEWprog's capabilities for displaying SIMprog runs, refer to the VIEWprog tutorial (Section 7).

Lesson 5: Partial Cutting with Regeneration

Lesson Objectives

This lesson will show you how to include regeneration in your treatment strategy.

Overview of Steps

1. Reset the name and description of the new run.
2. Define the regeneration assumptions.
3. Run the model.

Step 1: Reset the name and description for the new run

1. If the run conditions for Lesson 4 are still listed in the SIMprog main window, you can start directly from those.
2. Otherwise, click [Delete All] then recall the conditions from the database. (Under the **Runs** menu, select **OPEN Existing**, then on the **Select Existing Run** form, select **Lesson_4** and click [OK]).
3. An **Inventory Design Error** message window will remind you to enter the treelist filename for this run. Click [OK].
4. On the SIMprog main window, under the **Conditions** menu, select **Projections based on... ▸ Existing Stand ▸ Tree data ▸ ICH_example.tre**
5. Click [Edit] beside the **Run ID** summary to open the **Duration and labels** form. Change the name of the run to **Lesson_5** and the description to **Partial cut with regeneration**. Accept the default values for length of projection and time steps.
6. The site/stand information, inventory design, and merchantable volume limits remain the same as for Lesson 4.
7. To set the regeneration assumptions, go to Step 2.

Step 2: Define the regeneration assumptions

1. In the SIMprog main window, click [Edit] beside the **Conduct Commercial Thinning** summary to open the **Partial Cutting...by DBH Class** form. In the **Regeneration** frame select [Yes] and click [Assumptions].

   The **Partial Harvest Regen. Assumptions** form will appear, into which you will enter a set of regeneration assumptions. Note that information already entered on the **Site Information** form appears in grey and cannot be altered on this form.

   In the **Assumptions** frame, only the **Select Species** option is available. In this version of the model, SIMprog users must specify the species and quantity of regeneration, as the automatic regeneration routines in FVS have not been adequately calibrated for British Columbia conditions.

   In the **Establishment Regime** frame, you have a choice of **Natural Stand** or **Plantation**. In SIMprog, these options define regeneration height and age as follows:

In SIMprog, you must assume that all seedlings are either planted or natural.

In this lesson, assume that all of the stocking results from natural ingress.

Plantation	Assumes that planted seedlings will be 2 years old and 40 cm tall *at the end of the regeneration delay period.*
Natural Stand	Assumes that naturally regenerated seedlings will be either 15 cm tall (shade-tolerant species such as hemlock and cedar) or 30 cm tall (light-demanding species such as Douglas-fir and western larch) *at the end of the regeneration delay period.*

For this lesson, select **Natural.**

2. The **Year of Disturbance** and **Regeneration Delay** fields are used to control timing within the model.

Year of Disturbance	Establishes the calendar year corresponding to year 0 of the simulation.
Regeneration Delay	Sets the time lag that occurs until either the stand is planted or is naturally restocked. *Note:* The first growing season is assumed to occur in the year that the regeneration delay ends. To simulate summer planting, therefore, you must add 1 year to your regeneration delay.

Ignore the **Year of Disturbance** and the **Regeneration Delay (years)** as they cannot be edited. These boxes become activated only if this form's "sister" – **Planted/Natural Regen. Assumptions** – is used in a bareground projection. Bareground projections are not recommended with this version of Prognosis^{BC}.

3. In the **Specify Stocking By** frame, you specify the total expected stocking level (in stems per hectare) and a breakdown by species. If you select **Specify Stocking by SPH**, you must enter the actual number of stems by species. These will be added cumulatively to make up the total SPH. If you select **Specify Stocking by Percentage**, you must specify the total stocking and the percentage of each species.

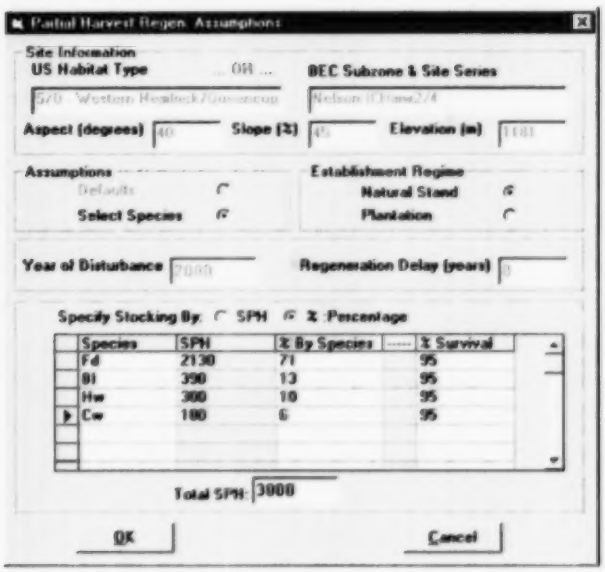
   Each row in the table in this frame represents one species. To select the first species, click on the first cell, then click on the list arrow that appears, then choose from the resulting species list. Add other species in subsequent rows following the same procedure. For each species, enter either the stems per hectare or percentage of total. If entering percentages, you must also enter the total SPH at the bottom of the table.

   The table also includes an option to specify survival rates for each species. *This should be the expected survival % at the end of the growing season for the year in which the model will next report.* For instance, if the disturbance year is 1996, the regeneration delay is 2 years, the planting density is 1600 SPH and the survival rate is 95%, then the plantation established in 1998 at 1600 SPH will have 1520 survivors in 2006, the next reporting year. After this point, further mortality will occur based on the built-in mortality functions of the model.

In the **Specify Stocking By** frame check the **%: Percentage** option, in the **Total SPH** text box enter **3000**, and fill out the table as follows:

Species	% By Species	% Survival
Fd	71	95
Bl	13	95
Hw	10	95
Cw	6	95

When completed, the **Partial Harvest Regen. Assumptions** form should look like the following:



4. Click OK. This will return you to the **Partial Cutting...by DBH class** form.

   Click OK. This will return you to the SIMprog main window.

Note: SIMprog treats regeneration as a single event that happens once in the 10-year time step. However, the FVS model behind the interface can accommodate more complex regeneration schemes, such as fill-planting, or regenerating with a combination of natural and planted trees of varying heights and ages. This is done using FVS keywords. Users wanting to represent a more complex regeneration scheme should contact the Growth & Yield Model Support Centre (see Section 1.7).

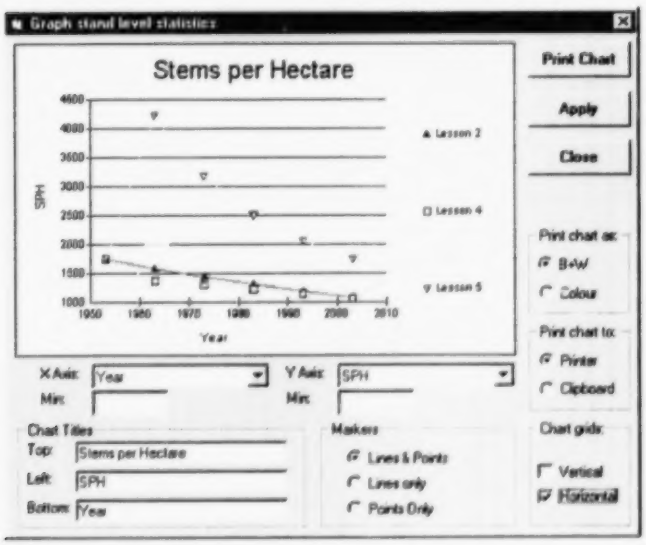
Step 3: Run the model

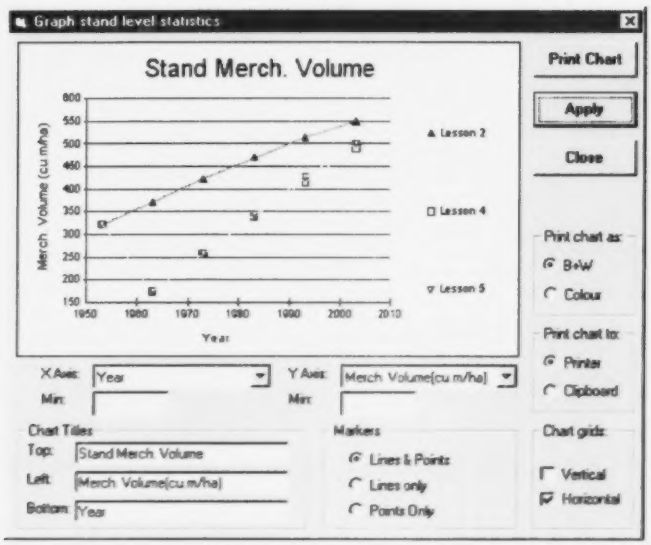
1. Click [Execute], and in the **Model Run Options** form, select **Import Projected Treelist** and **Execute Model Run**. Click [OK].

2. After the model is finished executing, close the DOS window and return to the SIMprog interface.

3. Under the **View Results** menu, select **Stand Summaries**, and in the **Select Runs to Compare** form, under **Available Runs**, select **Lesson_2, Lesson_4, Lesson_5**. In **Type of Output** frame, select **Graphs**. Click [OK].

4. A review of stand statistics for these lessons reveals that the regeneration contributed little to the subsequent stand volume as most of the regeneration succumbed to competition from the larger stems.





5. To return to the SIMprog main window, click Close, then select **Exit** under the **File** menu.

Lesson 6: Using the Root Disease Extension

Lesson Objectives

This lesson will show you how to include root disease in an existing stand simulation.

Overview of Steps

1. Reset the name and description of the new run.
2. Define the root disease levels.
3. Run the model and compare the results.

Key Concepts

- root systems are modeled as circles with the tree or stump in the middle
- infection level is described as the percentage of the circle's radius that is infected
- root disease is assumed to expand or contract along the radius in all directions
- a root disease centre is described as a circle that contains the total extent of diseased roots (inoculum sources), and the statistic of disease area is calculated as the total area inside all centres

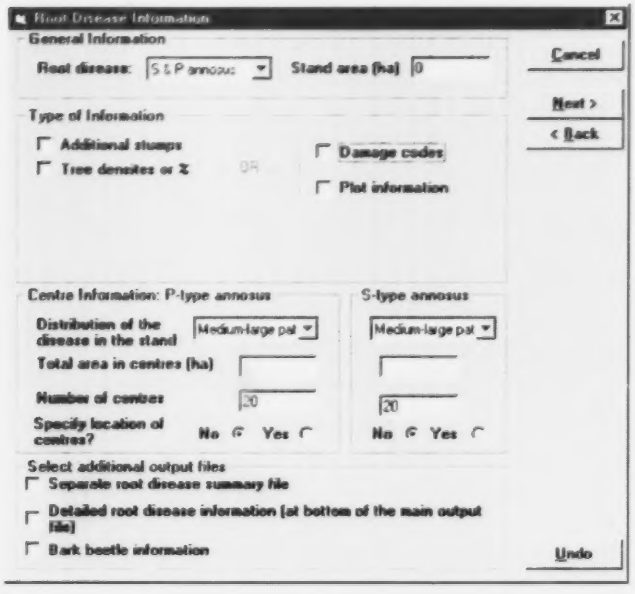
Step 1: Reset the name and description for the new run

1. If you have any run conditions listed in the SIMprog main window, click Delete All to clear them.
2. Under the **Runs** menu, select **OPEN Existing**, and on the **Select Existing Run Information** form, select **Lesson_5** and click OK.
3. Once the conditions appear in the SIMprog main window click Edit next to **Run ID**, and on the **Duration and Labels** form, change the name of the run to **Lesson_6** and the description to **Partial cut with regen and root disease**. Click OK.
4. The site/stand information, inventory design, merchantable volume limits, treelist, and partial cut treatment remain the same as for Lesson 5.

Step 2: Define the root disease levels

For this simulation, assume that you have no detailed information about root disease levels in the stand. The local pathologist has told you that the stand contains *Armillaria* root disease and that about 10% of the trees have some degree of active infection. This is sufficient information to add the root disease to the simulation.

1. Under the **Conditions** menu, select **Health ▸ Root Disease ▸ Basic Information**. This will display the **Root Disease Information** form.



2. The **General Information** frame is mandatory for root disease simulations. You must select one type of root disease from the drop-down list. Only S and P type *Annosus* can be simulated concurrently.

   - Replace the default root disease S & P annosus with **Armillaria ostoyae** from the drop-down list.

   - Enter **25** for the stand area (ha).

     This value is used only for the root disease part of the stand to assess root disease spread; it does not affect any other part of Prognosis^{BC}. If the stand is being run as one disease centre, this value is not as important.

3. The **Type of Information** frame provides the basis for initializing root disease in the simulation. Many options are available to initialize the root disease in the stand, depending on the amount and type of information available to the user. See *General Notes on Initializing Root Disease* at end of lesson.

   - Check the box for **Tree densities or %**. This will display the root disease type (**Armillaria**) and two additional boxes (**Infected** and **Uninfected**).

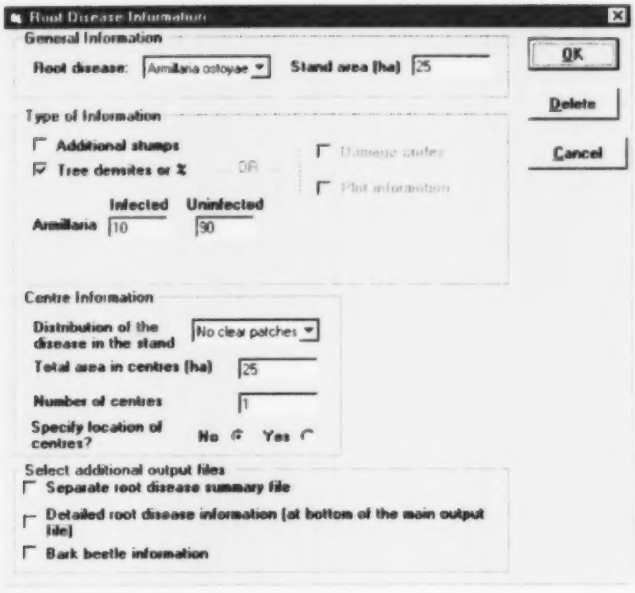
   - Enter **10** in the **Infected** box to indicate that 10% of the trees will be infected. The **Uninfected** box will automatically display 90.

4. The **Centre Information** frame describes how the root disease is distributed in the stand, the area it covers, and the disease centre(s) location. The most important component for initializing root disease is the area inside centres or the proportion of the stand that is inside centres. In general, the more area inside centres, the more impact the disease will have. Generally, the impact of the model on stand dynamics is independent of the number of centres in the stand. When the entire stand is modeled as a single centre, the density of infected trees becomes the critical factor.

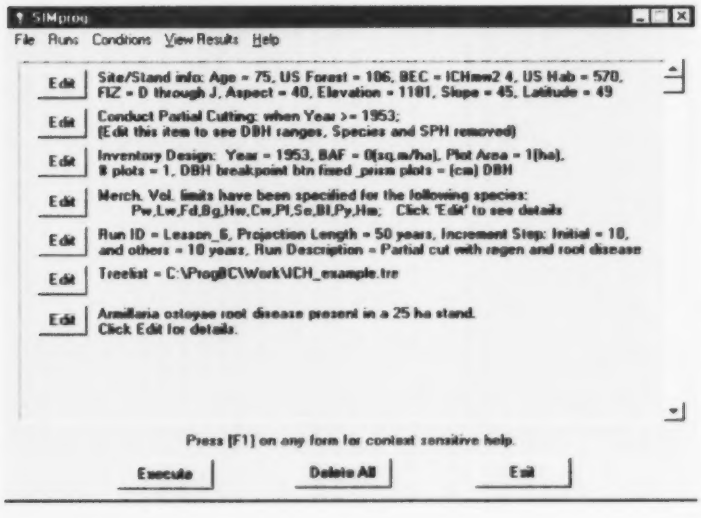
   - Select **No clear patches** from the drop-down list for distribution of the disease in the stand.

     SIMprog automatically sets the number of centres to **1** and the area inside the centre to **25** (the entire stand as entered in the **General Information** frame). This is the best assumption in the absence of information about the patchiness of root disease in the stand.

5. The **Select additional output files** frame allows users to request more detailed information about the dynamics of the root disease. It is used primarily by pathologists. The output files are in ASCII format that cannot be viewed through the SIMprog interface. Do not check any boxes in this frame.



6. Click OK. This will return you to the SIMprog main window, which should display the following conditions:


SIMprog
File Runs Conditions View Results Help
Edit
Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570, FIZ = D through J, Aspect = 40, Elevation = 1101, Slope = 45, Latitude = 49
Edit
Conduct Partial Cutting: when Year >= 1953;
(Edit this item to see DBH ranges, Species and SPH removed)
Edit
Inventory Design: Year = 1953, BAF = 0[sq.m/ha], Plot Area = 1[ha], 8 plots = 1, DBH breakpoint btn fixed _prism plots = [cm] DBH
Edit
Merch. Vol. limits have been specified for the following species:
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm; Click 'Edit' to see details
Edit
Run ID = Lesson_6, Projection Length = 50 years, Increment Step: Initial = 10, and others = 10 years, Run Description = Partial cut with regen and root disease
Edit
TreeList = C:\ProgBC\Work\ICH_example.tre
Edit
Armillaria ostoyae root disease present in a 25 ha stand.
Click Edit for details.
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

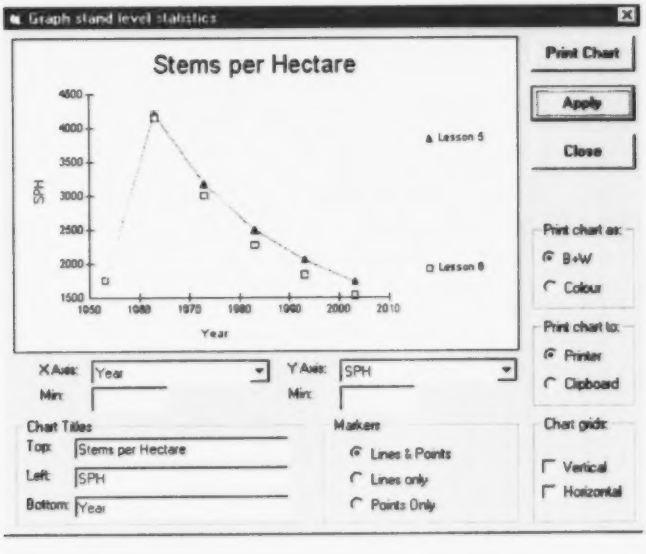
Step 3: Run the Model and Compare the Results

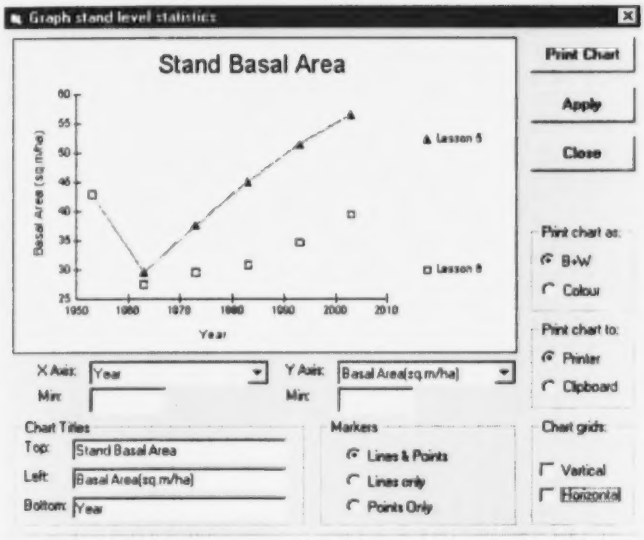
1. Click [Execute] and on the **Model Run Options** form select **Import Projected Treelist** and **Execute Model Run**.

2. Under the **View Results** menu, select **Stand Summaries**, and in the **Select Runs to Compare** form, under **Available Runs**, select **Lesson_5** and **Lesson_6**. In **Type of Output** frame, select **Graphs**. Click [OK].

   Compare the graphical output from Lessons 5 and 6 to see the effect of the root disease. (Refer to SIMprog Lesson 3, Steps 5 and 6 for instructions on how to compare charts from different runs.)

   The stand density is very similar in the two runs because root disease is not killing many more trees than would die naturally. However, the stand total volume and basal area graphs show that the stand with root disease (Lesson 6) has less volume due to the decreased growth experienced by infected trees.



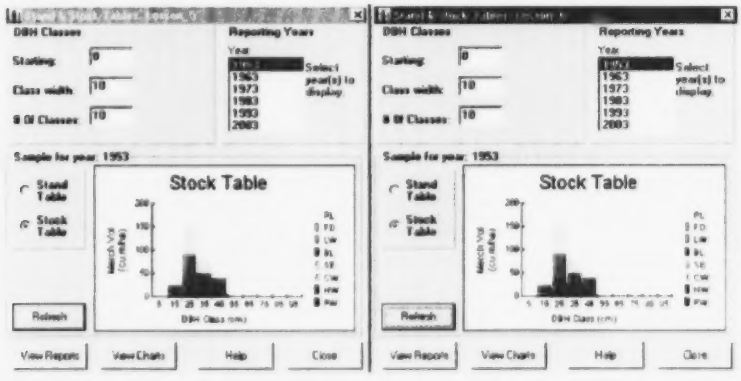


3. Next, view the results using VIEWprog. From the **View Results** menu select **By Species and/or DBH Class**. The VIEWprog splash screen will appear. Click OK.

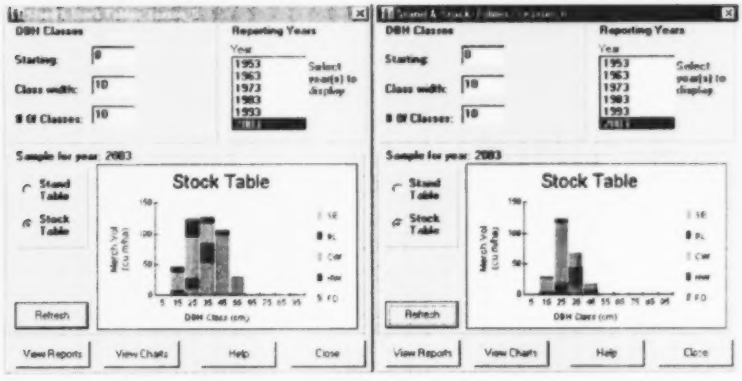
4. On the **Stand Structure Reporting System** form, in the **Available Runs** frame select **Lesson_5: Standing** and **Lesson_6: Standing**. In the **Report Type** frame check **Stand & Stock Tables**. Click OK.

   Two **Stand & Stock Tables** forms appear. On each form select the **Reporting Year 1953**, check **Stock Table**, and click Refresh.

   The tables are the same because the lessons use the same start conditions.



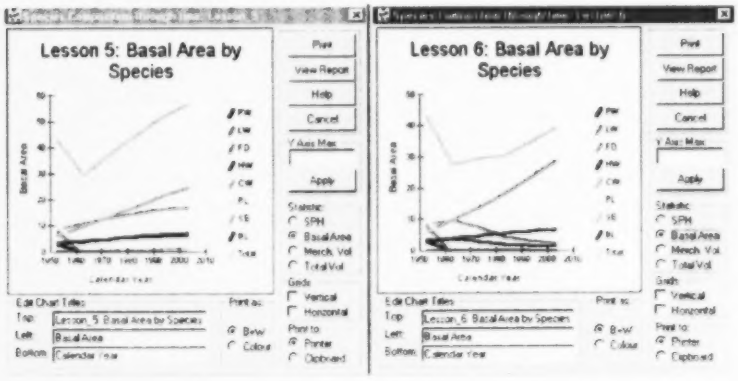
5. Next, on each form:
   - select the **Reporting Year 2003**
   - check **Stock Table**
   - click Refresh.



By the year 2003 the root disease has had time to take hold. The species composition of the two stands is now very different. Without root disease (Lesson 5), FD dominates that stand. With root disease (Lesson 6), there is much less FD and BL—species relatively susceptible to armillaria root disease—and fewer large trees.

6. Return to the **Stand Structure Reporting System** form and select **Species Composition**.

This graph shows that the root disease is killing FD and BL. The HW and CW are relatively unaffected by the root disease. There are sufficient numbers of cedar to occupy the growing space freed up by FD (primarily) and BL.



General Notes on Initializing Root Disease

Use the following guidelines to help you decide which options to use for initializing root disease in a stand.

Simulation type	Available information	How to initialize
Bareground or Existing Stand	Stump information (infected stumps or dead trees)	Select **Additional stumps** Enter stump information on the **Root Disease Inventory Details** form Run the stand as one centre unless you have better information
	No stump information	Do not choose any method of initialization and run the model as multiple centres with total area < stand area
Existing stand (treelist)	Damage codes collected during inventory	Select **Damage codes** and verify that **Tree density or %** is not checked
	...and plot-level information	Select **Plot information**, click Add Details On **Root Disease Inventory Details** form list whether each plot has/does not have root disease Run the stand as one centre unless you have better information
	No damage codes, but have plot-level information	Select **Plot information**, click Add Details On **Root Disease Inventory Details** form list the percentage of trees in each plot that have root disease Run the stand as one centre unless you have better information
	No plot-level information but know density or % of infected trees in stand	Select **Tree density or %** and enter the density or % of trees in the stand that have active root disease Run the stand as once centre unless you have better information

If you are running the stand as one centre, it is most important to have good estimates for the proportion of the trees that are infected. If you are running the stand as multiple centres, it is most important that you have a good estimate for the number of centres and the sum of their area.

Section 7

VIEWprog Tutorial

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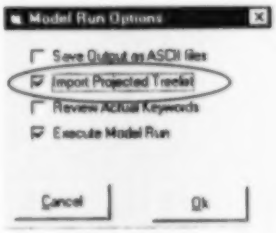
7.1 Introduction to VIEWprog

VIEWprog is the graphical reporting component of Prognosis^{BC}. It offers a powerful graphics interface to view the results of stand treatments projected with SIMprog.

Data Inputs

To run VIEWprog, you will need to import the projected treelist when executng SIMprog

VIEWprog requires the projected treelist (circled below) to be imported when executing a run in SIMprog.



Graphic Outputs

VIEWprog provides two types of reports that allow users to compare the responses of different stand structures to various treatments over time:

- *Stand & Stock Tables* – display stand structure by species and diameter class for each time step in the projection. For each combination of species and diameter class, stand composition is quantified in terms of either density (stems per hectare) or merchantable volume per hectare.
- *Species Composition* – displays changes in stand-level attributes (stems per hectare, basal area, merchantable volume, total volume) over time, by species.

Both types of report can be displayed for one run, or one type of report can be displayed for two different runs. With either report type, both charts and tables can be produced. The default format is charts.

Because of the multitude of charts generated during comparisons, charts are not saved in VIEWprog. Charts can be printed in both black and white, and colour, or can be cut and pasted into other applications (e.g., Microsoft Word or PowerPoint) for future reference. Only tabular reports can be saved as files.

7.2 Tutorial Overview

The tutorial is intended for people new to VIEWprog.

If you are already familiar with VIEWprog, you may wish to go to the QuickReview, Section 4.9.

The tutorial uses the **Lesson_5: Partial cut with regen** run created in the SIMprogtutorial.

You must complete the SIMprog tutorial before starting this VIEWprog tutorial.

The purpose of this tutorial is to familiarize users with VIEWprog's capabilities for displaying stand projection results. In these lessons, you will learn how to display:

- stand (density), stock (merchantable volume), and species composition data in charts and tables
- two types of reports (stand and stock tables *and* species composition) for one run
- one type of report for two different runs.

Lesson 1: Stand and Stock Tables Preview Window

How to explore stand and stock tables through the preview window before producing them as tables or charts.

Lesson 2: Stand or Stock Table Report

How to display, edit, print, and save stand or stock tables as *reports* (tabular output).

Lesson 3: Stand or Stock Table Chart

How to display, edit, print, and save stand and stock tables as *charts* (graphic output).

Lesson 4: Species Composition Chart and Report

How to plot, edit, and print or save a *chart* and a *report* that displays species composition over time.

Lesson 5: Comparing Charts

How to plot two charts at a time—two charts for one run, or one chart type for two runs.

Lesson 1: Stand and Stock Tables Preview Window

Lesson Objective

Stand (density) and stock (merchantable volume) information is reported by species and DBH class for each time step in a SIMprog projection. This information can be displayed in table or chart (graph) form using VIEWprog.

This lesson explains how to explore stand and stock tables through the preview window before producing them as tables or charts.

Overview of Steps

1. Start VIEWprog.
2. Select the run and type of report (Stand & Stock Tables).
3. Specify DBH class width and selected time steps.
4. Display stand (density) or stock (merchantable volume) table information in the preview screen.

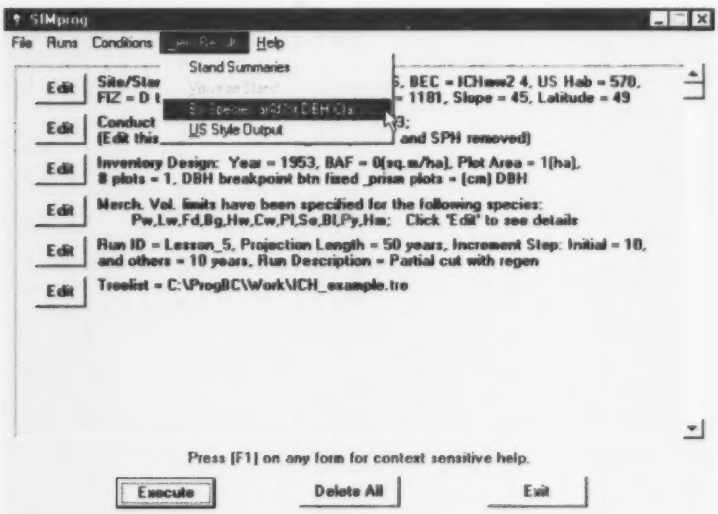
Step 1: Start VIEWprog

VIEWprog can be opened in two ways:

- double click on the VIEWprog icon in the ProgBC folder on your computer (refer to Section 1.4, Installing Prognosis[BC])
- launch VIEWprog from the **View Results** menu in SIMprog.

In this lesson, you will use treelist data from the SIMprog tutorial Lesson 5, and will launch VIEWprog from within SIMprog.

1. In SIMprog, execute Lesson 5 with the **Import Projected Treelist** option selected on the **Model Run Options** form.
2. In the SIMprog main window, select **View Results**, and **By Species and/or DBH Class.**


SIMprog
File Runs Conditions Help
Stand Summaries
US Style Output
Edit
Inventory Design: Year = 1953, BAF = 0(sq.m/ha), Plot Area = 1(ha),
8 plots = 1, DBH breakpoint btn fixed _prism plots = (cm) DBH
Merch. Vol. limits have been specified for the following species:
Pw,Lw,Fd,Bg,Hw,Cw,Pl,Se,Bl,Py,Hm; Click 'Edit' to see details
Run ID = Lesson_5, Projection Length = 50 years, Increment Step: Initial = 10,
and others = 10 years, Run Description = Partial cut with regen
Treelist = C:\ProgBC\Work\ICH_example.tre
Press [F1] on any form for context sensitive help.
Execute
Delete All
Exit

This will take you to the VIEWprog splash screen. Click OK. **Stand Structure Reporting System** form will open.

Step 2: Select the run and report type

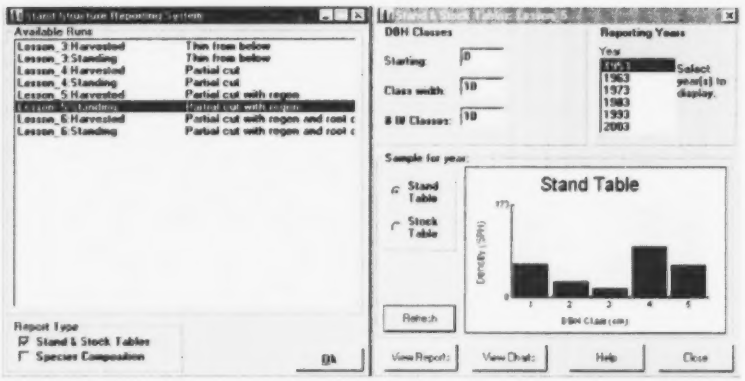
In the **Stand Structure Reporting System** form, the **Available Runs** frame lists the SIMprog runs for which projected treelists are available.

Note that:

- **Lesson_1** and **Lesson_2** are missing from this list. When these runs were executed in SIMprog, the **Import Projected Treelist** box of the **Model Run Options** form was not checked.
- For each run that included a harvest treatment, two results are reported:
  - the "standing" run reports on the portion of the stand that was not harvested
  - the "harvested" run reports on the portion of the stand that was harvested.

1. Select **Lesson_5: Standing Partial cut with regen** and in the **Report Type** frame, check **Stand & Stock Tables**.
2. Click [OK].

   This will display the **Stand & Stock Tables: Lesson_5** form. The preview window default is a "dummy" **Stand Table** (shown below). Click [Refresh] to load the data from the Lesson 5 run.



Elements of the preview window are explained below:

DBH Classes	
Starting:	Enter the minimum diameter that you want to report
Class width:	Enter the width of diameter class
# Of Classes:	Enter the number of diameter classes
Reporting Years	Select the time step(s) for which you wish to view results. To select multiple time steps, hold down the shift key while clicking on the years.
Sample for year:	Displays the selected year(s) for reporting.
Stand Table	Creates a table of stand density (SPH)
Stock Table	Creates a table of merchantable volume (m^3/ha)
Refresh	Click to update the chart after any changes to the DBH Classes or Selected Time steps frames.
View Reports	Click to view, customize (edit run title and description), print, and save run conditions report
View Charts	Click to view, customize, and print graphical output

The **Stand & Stock Tables: <Run ID>** form allows you to customize reports (or charts) displaying stand structure by species and DBH class. The form opens to a preview window with a chart for a single time step in a run.

Building stand & stock table reports is a two-stage process. The first stage involves:

- defining the DBH classes
- choosing whether to display stand (density) or stock (merchantable volume) information
- deciding the year(s) for which you want to display stand structure (selected time steps).

Once you have decided on the information to display, the second stage in building a report involves customizing the tabular or graphic output accessed through [View Reports] and [View Charts], respectively.

Step 3: Specify DBH class width and selected time steps

The **Stand & Stock Tables** form opens to a preview window with a default chart of stand density.

Click [Refresh] to update the chart:

- when the chart opens
- after making any changes to the **DBH Classes** or **Reporting Years** frames.

In the **DBH Classes** frame, you must specify the minimum DBH and the width and number of diameter classes that you wish to display.

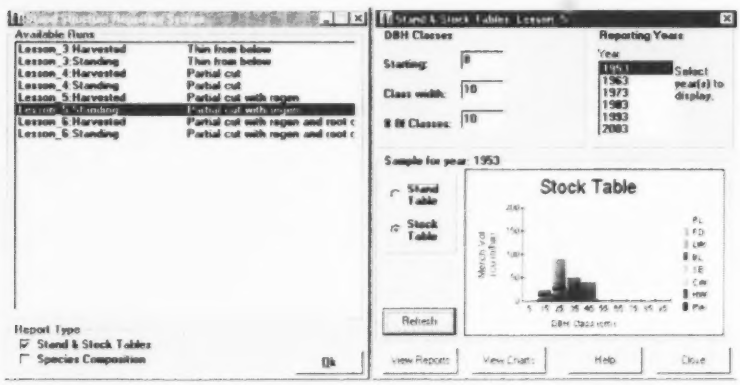
The preview frame is useful in making these choices—especially in determining the most appropriate width and number of diameter classes for displaying results from a range of time steps with varying size class distributions. Experiment with various combinations of density and merchantable volume, DBH class, and time steps, and click [Refresh] to see preview graphs of the associated stand structures.

1. Begin with the default values of **0** (**Starting**), **10** (**Class width**), and **10** (**# Of Classes**) in the **DBH Classes** frame, and with the default **Stand Table** preview chart.
2. In the **Reporting Years** frame, click on each time step and then [Refresh] to check the diameter class distribution for that time step. When you have viewed the distributions for all time steps, confirm or change the number of DBH classes to display.

Step 4: Display stand or stock information in preview window

As noted in Step 2, the **Stand & Stock Tables: <Run ID>** form opens to a preview window with a default **Stand Table**.

1. Click **Stock Table**, then [Refresh] to see a preview of the merchantable volume chart.



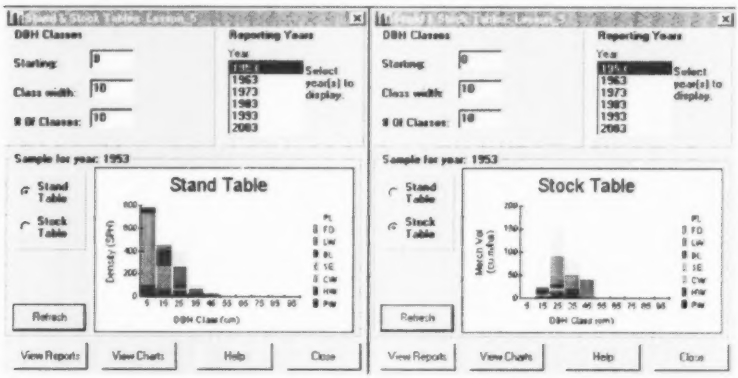
2. In the **Reporting Years** frame, click on each time step then click [Refresh] to check the diameter class distribution for that time step. When you have viewed the distributions for all time steps, confirm or change the number of DBH classes to display.

3. It is also possible to display both stand and stock tables for a run.

   With the **Stock Table** chart still displayed in the preview window, go to the **Stand Structure Reporting System** form and select **Lesson_5: Standing Partial cut with regen** and click [OK].

   A second **Stand & Stock Tables: Lesson_5** screen will appear with the default **Stand Table** chart displayed in the preview window. Click [Refresh] to display the data for Lesson 5.

   Your screen should show preview charts of both density and merchantable volume in 1953.



The next lessons will discuss how to further develop this information as tables and charts through the [View Reports] and [View Charts] buttons.

Lesson 2: Stand or Stock Table Report

Lesson Objective

This lesson explains how to display, edit, print, and save stand or stock tables as *reports* (tabular output).

Overview of Steps

1. View/edit the report and create the table.
2. Print/export/save the report.

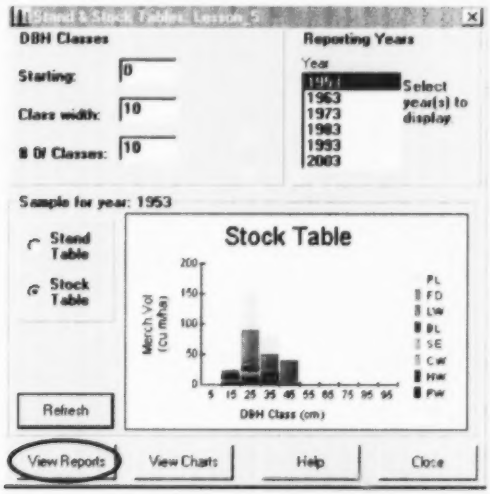
Step 1: View/edit the report and create the table

This lesson continues with the Stock Table preview chart from Lesson 1, Step 4.

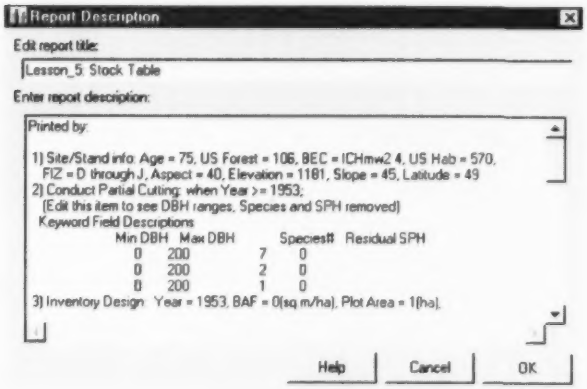
Tabular output is generated through the View Reports button on the **Stand & Stock Tables** form.

A **Report Description** form displays the run title and run description. Based on the information in this form, the stand or stock table is compiled and displayed in its own window. A series of buttons along the bottom of the stand or stock table window enable the table to be resized, printed, or saved to a file.

1. On the **Stand & Stock Tables: Lesson_5** form showing a **Stock Table** preview chart, click View Reports.

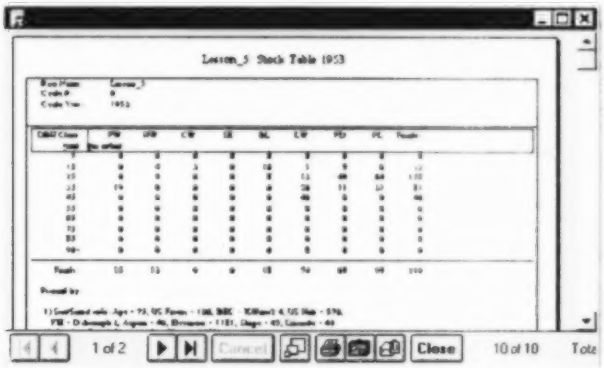


This will take you to the **Report Description** form.


Report Description
Edit report title:
Lesson_5: Stock Table
Enter report description:
Printed by:
1) Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570,
FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
2) Conduct Partial Cutting: when Year >= 1953;
(Edit this item to see DBH ranges, Species and SPH removed)
Keyword Field Descriptions
Min DBH Max DBH Species# Residual SPH
0 200 7 0
0 200 2 0
0 200 1 0
3) Inventory Design: Year = 1953, BAF = 0(sq.m/ha), Plot Area = 1(ha).
Help
Cancel
OK

2. Review the title and report description (the same as the SIMprog run description). Overtype the report title to change it to: **Lesson_5: Stock Table 1953**.

3. Click OK to generate the stock table.



Step 2: Print/export/save the report

Once a table is compiled in VIEWprog, it is displayed in a window that allows it to be sized, printed, or exported using the following buttons.

VIEWprog does not save reports and charts. Save charts and/or reports by copying them to another application (e.g., MS Word or PowerPoint).

Move page up or down

Zoom in or out

Print the chart or table to a printer

Export the chart/table in a specified format for another application

Export the chart/table as an e-mail attachment

Lesson 3: Stand or Stock Table Chart

Lesson Objective

This lesson explains how to display, edit, print, and save stand and stock tables as *charts* (graphic output).

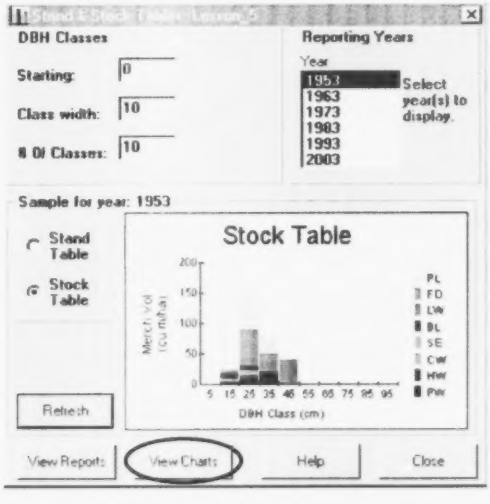
Overview of Steps

1. Identify the run and stand or stock information that you wish to chart.
2. View/edit/print the chart.

Step 1: Identify the run and stand or stock information that you wish to chart

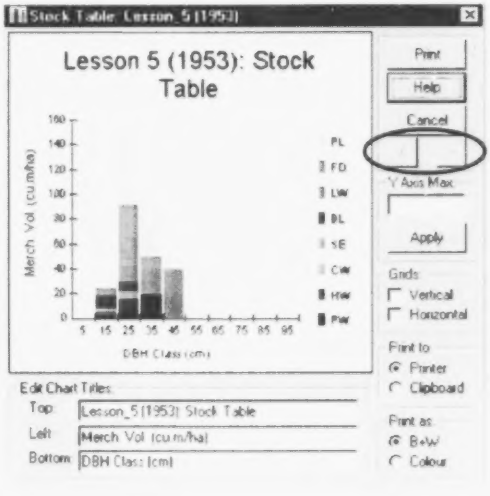
This lesson continues from VIEWprog Lesson 1, Step 4 (1).

1. Return to the **Stand & Stock Tables: Lesson_5** form displaying the **Stock Table** in the preview window.



To select a range of time steps on the **Stand & Stock Tables** form, click on the time step at the start of the range, hold the **SHIFT key** down, and click on the time step at the end of the range.

2. Click View Charts. This will take you from the preview window into the chart where it can be customized to meet your needs.



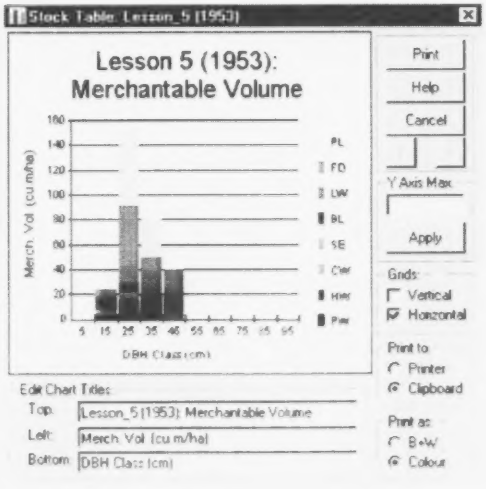
When several time steps have been selected on the **Stand & Stock Tables** form, the **Chart Print Preview** form arrow buttons < and > will be active. They are used to cycle through the charts for each time step.

Step 2: View/edit/print the chart

Customize charts using the following features:

Edit Chart Titles	Overtype existing entries to change chart title and axis labels.
Y Axis Max	Change the Y-axis range by entering a new maximum value. This feature provides a common Y-axis for the charts for all currently selected time steps, so long as the input value is ≥ the current Y-axis value for all active charts. If any one chart has a default Y-axis value > the new value, the default value will remain for that particular chart.
Grids	Select whether or not to display vertical and/or horizontal grid lines.
Print to	Select printer or clipboard. If clipboard is selected the chart image only (not the whole screen image) will be copied to the clipboard for subsequent pasting into another application when Print is clicked. To print multiple charts, each chart must be displayed in the chart preview frame and printed individually.
Print as	Select black & white or colour; this option applies both to charts sent to a printer or charts copied to the clipboard.

1. Overtype the **Top** title to display: **Lesson 5 (1953): Merchantable Volume.**
2. Under **Y Axis Max,** leave the box blank.
3. Under **Print to**, select **Clipboard**.
4. Under **Print as**, select **Colour**.
5. Under the **Grids** option, select **Horizontal**.
6. Click Print. This will make the chart available on the Clipboard to paste into other applications.



Lesson 4: Species Composition Chart and Report

Lesson Objective

This lesson shows how to plot, edit, and print or save a *chart* and a *report* that displays species composition over time.

Overview of Steps

1. Select the run and report type.
2. Select statistic to plot, edit chart, and save or print chart.
3. Select statistic to plot, edit report description, and save or print report.

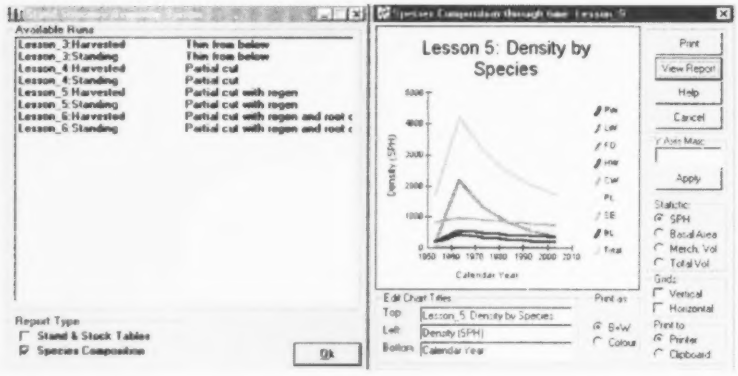
Step 1: Select the run and report type

1. On the **Stand Structure Reporting System** form select **Lesson_5: Standing Partial cut with regen**.

   In the **Report Type** frame select **Species Composition**.

2. Click [OK].

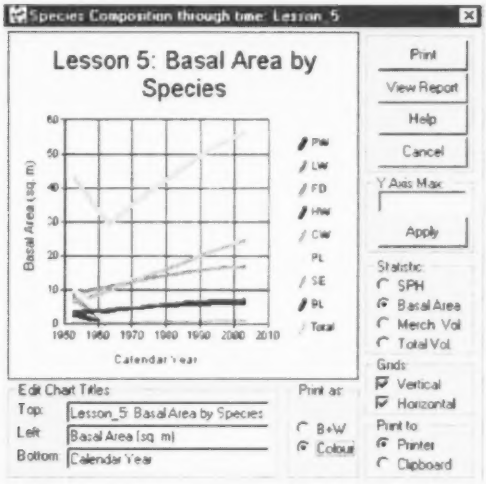
   This will display the **Species Composition through time: Lesson_5** form with the default chart of **Density by Species**.



Step 2: Select statistic to plot, edit chart titles, and print chart

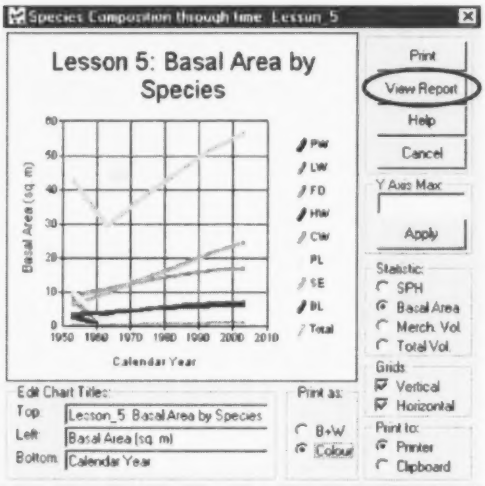
You can edit, customize, and print the chart, or export the image to another application following the instructions as in Lesson 3, Step 2.

1. In the **Statistic** frame select **Basal Area**.
2. In the **Edit Chart Titles** frame, overtype the Left title to **Basal Area (sq. m)**.
3. In the **Chart grids** frame select **Horizontal** and **Vertical**.
4. Under **Print as** select **Colour**.
5. Under **Print chart to** select **Printer**.
6. Click [Print].

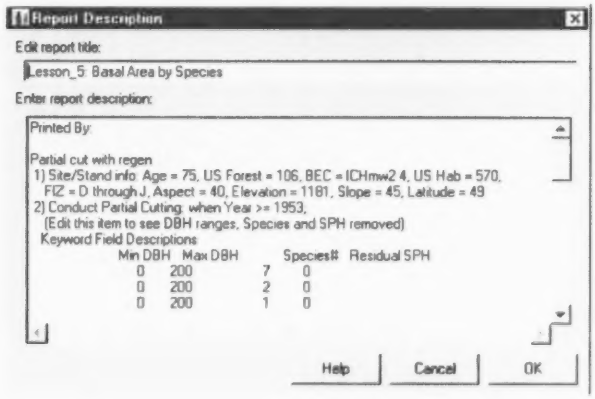


Step 3: Select statistic to plot, edit report description, and save or print report

The report option is accessed through View Report on the **Species Composition through time** form.

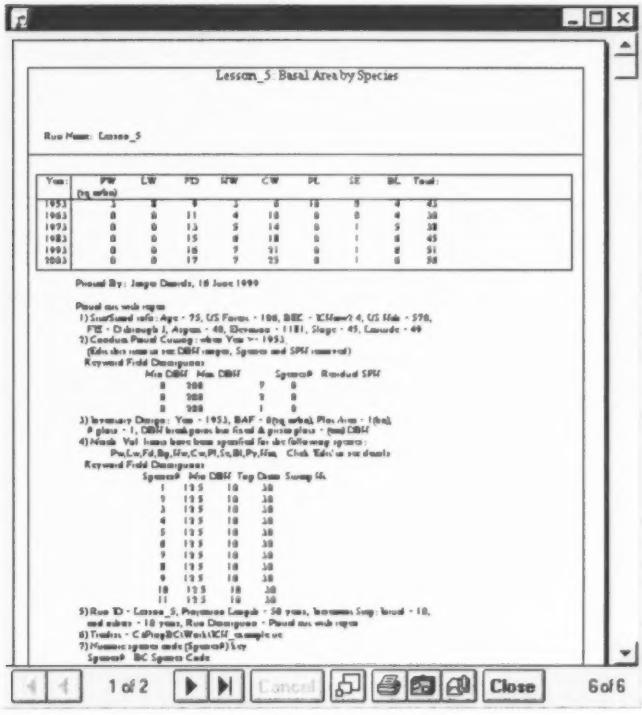


1. Under **Statistic**, choose the parameter you wish to plot—for this lesson, continue with **Basal Area**, where we finished in the previous step.
2. Click View Report. This will take you to the **Report Description** form.


Report Description
Edit report title:
Lesson_5: Basal Area by Species
Enter report description:
Printed By:
Partial cut with regen
1) Site/Stand info: Age = 75, US Forest = 106, BEC = ICHmw2 4, US Hab = 570,
FIZ = D through J, Aspect = 40, Elevation = 1181, Slope = 45, Latitude = 49
2) Conduct Partial Cutting: when Year >= 1953,
(Edit this item to see DBH ranges, Species and SPH removed)
Keyword Field Descriptions
Min DBH Max DBH Species# Residual SPH
0 200 7 0
0 200 2 0
0 200 1 0
Help
Cancel
OK

In the **Edit report description** field, after **Printed By:** add your name and the date.

3. Click OK. This will compile the **Lesson_5: Basal Area (by Species)** table, which can then be sized, printed, or copied and pasted to another application using the function buttons at the bottom of the window (refer to Lesson 2, Step 2 for a description of how these buttons work).



Lesson 5: Comparing Charts

Lesson Objectives

This lesson shows you how to plot two charts at a time. This feature makes it possible to compare:

- two charts (e.g., density and merchantable volume) for one run
- one chart (e.g., density) for two runs.

Overview of Steps

1. Plot two charts for a selected run.
2. Plot one chart type for two different runs.

Step 1: Plot two charts for a selected run

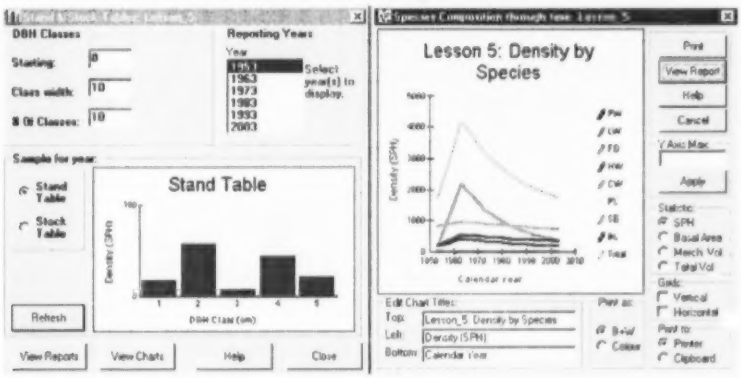
If both Report Types are checked, both Stand and Stock and Species Composition charts are generated.

1. On the **Stand Structure Reporting System** form **select Lesson_5: Standing Partial cut with regen**. In the **Report Type** frame select both **Stand & Stock Tables** and **Species Composition**.

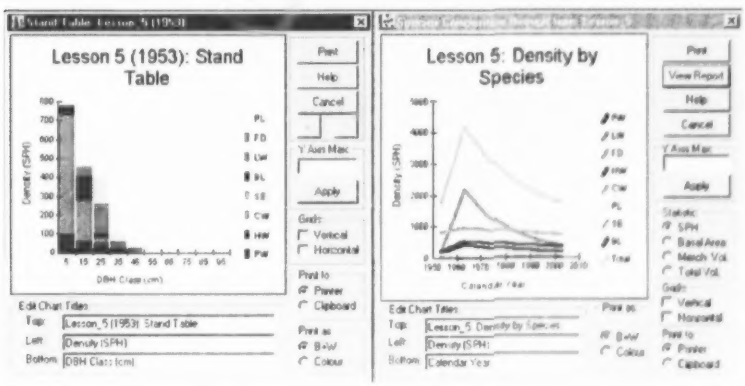
2. Click OK.

   This will display two charts, as shown below:

   - **Stand Table** for each time step of the simulation (note that this is the default display and does not show Lesson 5 until you click Refresh.
   - **Density by Species** (Species Composition through time)



3. The **Stand Table** chart (left) is in a preview window. Click View Charts to go to the actual chart. In this format, both charts can be edited and customized for exporting to a printer or other application.

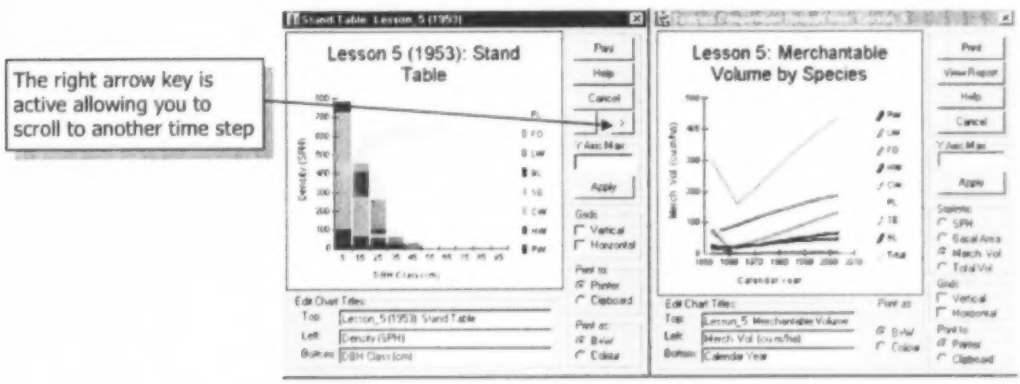


Note that both charts display stand density (SPH). The Stand Table chart displays stand density by species and diameter class, and the Species **Composition** chart displays stand density by species and calendar year.

4. If you wish to view the **Stand Table** chart for another time step (e.g., **2003**), then click Cancel to return to the **Stand & Stock Tables** form.

5. Another interesting combination of charts to compare is **Merchantable Volume by Species through time** and **Stand Table** for all time steps.

   - On the **Species Composition through time chart** (right), under **Statistic**: select **Merch. Vol.**
   - On the **Stand Table** chart (left), click Cancel, which will return you to the preview chart, then select all time steps by clicking on **1953**, depressing the shift key, and using the down arrow key (or click-and-drag). Click View Charts.
   - The following pair of charts will be displayed:


The right arrow key is active allowing you to scroll to another time step
Lesson 5 (1953): Stand Table
Lesson 5: Merchantable Volume by Species

6. Note that the right arrow key on the **Stand Table** chart is active. Use this to scroll through each time step. You can see that in 1963, you no longer have PL, LW, PW components in the stand (these were removed in the partial cut).

   As you move through the time steps, you will see the change in diameter distribution of the remaining species, consistent with the Merchantable Volume distribution by species through time.

Step 2: Plot one chart type for two different runs

VIEWprog also allows you to compare two runs in terms of a specified parameter. The following example shows stock tables for Lesson 5 (Partial cut with regen) and Lesson 6 (Partial cut with regen and root disease) in the year 2003.

1. Close the two charts from Step 1. On the Stand Structure Reporting System form select Lesson_5: Standing Partial cut with regen and Lesson_6: Standing Partial cut with regen and root disease.

   In the **Report Type** frame select **Stand and Stock Tables**.

2. Click [OK]. This will display two preview windows with "dummy" **Stand Tables** for Lessons 5 and 6. Change the information displayed following instructions in Lesson 3